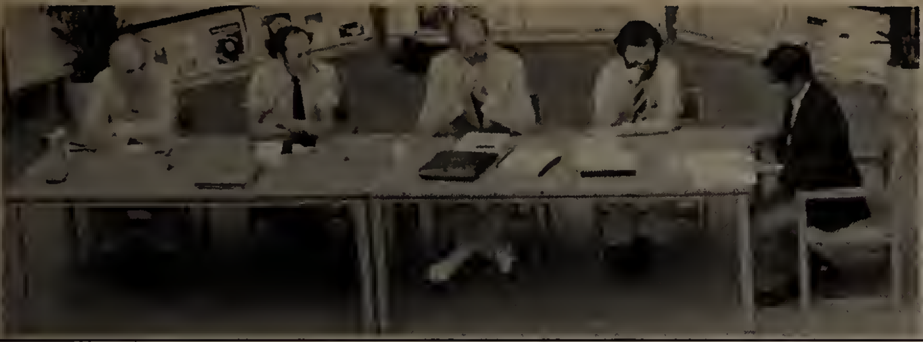

CW Photo by C. Marenghi

IN DEPTH:
The Data Base Debate!

Relational or Codasyl? That was the central issue of a lively debate among heavy hitters in the data base field: Dr. E.F. Codd, C.J. Date, Charles Bachman, Frank Manola and moderator Dr. Eugene Wong. The debate follows Page 76.

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Product Spotlight

How to Recover From a Disaster?

By Marguerite Zientara
CW Staff

What would you do if your computer installation went up in a puff of smoke tonight?

If you have pondered that question but still have no answers, the charts on Pages 10 and 11 will give you an idea of what's available in the U.S. in terms of commercial DP disaster recovery sites.

Business has traditionally avoided the whole question of computer-specific disaster recovery in spite of the fact that its dependence on the data stored in computers increases daily. One recent study found disaster control and recovery an "amazingly neglected" area of interest.

"Today, complete faith in the computer's reliability is widespread," reported London-based Butler Cox & Partners Ltd. in its Amdahl Corp.-sponsored study. "Particularly since the advent of large on-line and interactive systems, it is not at all unusual . . . for companies to install business

(Continued on Page 11)

Mainframers Kick Off Fall Season

• NAS Enters Scrimmage To Win DDP System Users

By Jeffry Beeler
CW West Coast Bureau

MOUNTAIN VIEW, Calif. — National Advanced Systems, Inc. formally entered the distributed data processing business today with the introduction of a medium-scale processor/network controller that reportedly combines the IBM 8100's ease-of-use features with the IBM 4300's 370-type architecture.

On one hand, the AS/1100 is optimized for interactive office automation functions and is intended primarily as a replacement for the 8100, a NAS spokesman said.

On the other hand, however, the system reportedly resembles the IBM 4300 series in its communications features, software development aids and its ability to do remote batch processing jobs. The AS/1100 comes with an optional Systems Network Architecture interface that allows the machine to support hierarchical communications with a central site's 370-compatible mainframe, the spokesman said.

The NAS product also supports peer-to-peer communications with either a remote host CPU or another DDP system and allows terminals or other peripherals out in the field to be interconnected to form local networks.

NAS describes its AS/1100 as a modified version of Paradyne Corp.'s recently announced Response system, a combination network controller and remote batch processing machine. Like Response, the NAS system boasts dual processors, one for DP and the other for network

(Continued on Page 8)

• IBM Caps Processor Line With Its Biggest CPU Yet

By Tom Henkel
CW Staff

RYE, N.Y. — With little fanfare on the day that marked the start of the Labor Day weekend, IBM introduced its largest processor to date, the 3084.

The company also announced the 3081 Model Group G, a slightly faster replacement for the Model Group D it brought out nearly two years ago. IBM said the 3081-G processor carries the same price tag as the 3081-D, but features a better price/performance ratio and a growth path for users of IBM's smaller 3083 series of processors (story on Page 6).

Combined, the announcements mean that a user of IBM's entry-level 3080 series processor, the 3083 Model Group E (a comparatively small mainframe processor), can upgrade to IBM's biggest processor without having to scrap existing hardware. In addition, 3080 series users who convert to IBM's recently announced MVS/XA operating system can make processor upgrades without significantly altering their operating systems, IBM said.

The 3084 — made up of two 3081 Model Group K processors, each of which is comprised of one dyadic (two tightly coupled) processors — is being offered only as an upgrade to the 3081-K. The four processors give 3084 users 1.9 times the performance of the 3081-K, according to the vendor.

The 3084 features up to 64M bytes of main memory and 48 I/O channels. It comes in configurations with 32M,

(Continued on Page 6)

Computer Sticks, So Goode Predicts

By Bruce Hoard
CW Staff

LOS ANGELES — Bud Goode was uncomfortable. He fumbled from one readout to another, marshaling an army of last year's statistics. The Sperry Univac 1106 stood pat. It refused to pick a winner in next January's Superbowl XVII. Too many variables — injuries, the human element, weather. But Goode had to choose.

The man who picks 'em for the *Philadelphia Inquirer* and sells a weekly 80-page computerized readout to some of the National Football League's top coaches was on the spot.

"Long-range predictions in football are so dependent," he lamented. "It's foolish to make them."

Pressed, he gave ground. Despite the fact the Dallas Cowboys and Philadelphia Eagles are statistically dead even in the NFL's National Football Conference, he admitted to "leaning" toward the Eagles as Superbowl finalists.

He grimaced when asked to pick a finalist from the American Football Conference. The Cincinnati Bengals, the San Diego Chargers. Bengals, Chargers. Chargers, Bengals. It could go either way.

"I'm going to go with Cincinnati," he finally declared, "because San Diego has got to prove to me that its defense is better this year than it was last."

Now the big one. The colossus of American sport. The Superbowl.

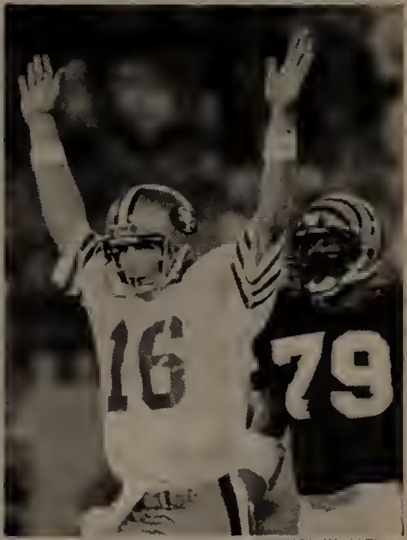
Goode agonized. There was a moment's pause. Then he spoke: "If Goode's forced to make a pick, he goes with the stronger defensive team. Philadelphia."

Goode made other, more comfortable picks based on the 130 variables crunched each week by the 1106. Last year's Superbowl champs, the San Francisco 49ers, will fight it out for supremacy in the NFC West with the Atlanta Falcons. The Detroit Lions and Tampa Bay Buccaneers will contest the NFC Central Division's top spot.

In the AFC, the Kansas City Chiefs are a "dark horse" that may push the Bengals. The New York Jets will win in the AFC East, "but Miami will be close," he added.

Returning to the more predictable present, Goode turned his attention

(Continued on Page 8)



Wide World Photo

Will San Francisco quarterback Joe Montana reign triumphant once again in Superbowl XVII?

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Defense's Hand Strengthened

IBM 'Sting' Files Stay Open: Judge

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — A federal judge here has rejected a government request to seal files detailing IBM's role in the recent Federal Bureau of Investigation "sting" operation against two leading Japanese electronics firms.

In a Sept. 3 hearing in U.S. District Court here, Judge Robert Aguilar reaffirmed a court order he issued only about a month earlier. The order in question granted defendants in the IBM trade-secrets theft case permission to inspect any files that may shed light on IBM's relationship with federal investigators.

Aguilar's decision is believed likely to strengthen the defense's hand as it seeks to prove its long-standing contention that:

- The targets of the FBI's undercover investigation are victims of government entrapment.
- The government's sting operation was carried out under IBM's direction.
- Investigators in the case were more concerned with squelching the industry giant's competitors than with protecting its trade secrets.

The outcome of the Sept. 3 hearing has left defense attorney Lawrence Callaghan and his client Raymond Cadet feeling generally "gratified," the lawyer said. Callaghan interpreted Aguilar's ruling as a tacit acknowledgment by the judge that the defense has raised enough legitimate questions about IBM's involvement in the FBI sting operation to warrant further investigation.

In other Sept. 3 court actions, Aguilar amended a second court order that threatened to place many of the case's most important documents under a tight lid of secrecy. In its revised form, the court order is much more limited in its scope than before and applies only to documents that contain bona fide IBM trade secrets.

Although the secrecy order has been relaxed somewhat, Aguilar upheld a provision that denies expert witnesses access to any secret IBM documents until the individuals' names have been forwarded to the prosecution. The requirement for advance notice has drawn fire from the defense.

Aguilar's Sept. 3 rulings were precipitated by a sequence of legal events that began earlier this summer when the defense requested access to huge quantities of government and IBM documents. The purpose of the request was to try to uncover evidence that might damage the prosecution's case and possibly even force the federal government to drop its charges.

Shortly after Aguilar last month granted the defense's request for IBM documents, the local U.S. Attorney's office appealed the decision. The court's response to the prosecution's protest came during the Sept. 3 hearing.

Aguilar's ruling paves the way for the defense to obtain an assortment of IBM documents and compels the government to disclose the identities of the sting operation's confidential informants. The decision also forces the prosecution to reveal personnel information about the agents who participated in the investigation.

Confidential informants and undercover investigators posing as gray-market electronics dealers played a key role in cracking the industrial espionage case, which has resulted in indictments against 21 individuals and two Japanese firms — Hitachi Ltd. and Mitsubishi Electric Corp. Most of the individual suspects and both the companies have been charged with conspiring to steal IBM trade secrets and transport them from the U.S. to Japan.

CW Seeking DBMS Articles

There is still time to submit an article for the upcoming special report on data base management systems (DBMS), which will appear in the Oct. 25 issue of *Computerworld*.

We are interested in application stories describing how you have selected a DBMS and how it is working for you. In addition, we would like to see articles that are not product-specific describing DBMS concepts.

Please keep your submissions between four and seven pages in length (not including graphics, which are welcome) and send them by Oct. 1 to Susan Blakeney at *Computerworld*, 375 Cochituate Road, Framingham, Mass. 01701.

This Week

IN DEPTH

The Data Base Debate! ....Follows Page 76

NEWS

Lack of Good Teachers Marring DP Education 4
Memorex Offers Thin-Film 3370, 3380 Rivals 5
IBM Fills Performance Gap by Bringing Out 3081-G ..6
New IDMS Applications Modules Ready in '83 7
Gsat Plans Satellite Net to Underprice AT&T 8
Product Spotlight: Disaster Recovery 10-12
Calif. Tax Bill Would Exempt Custom Software 13
Manual Tells How to Hire Handicapped DPers 14
Lawyer Sees Trade Secrets Suits Escalating 15
Food Firm Gobbles Costs With Hand-Held Units 16
Off the Press 17
Scotland Yard to Battle Crime With System 18
Credit Union Credits Growth to In-House System ...20
Utility Saves With In-House Transfer Agent 21
Hospital Slices Stockpiling Costs With System 22
Firm Finds Pooling Credits, MIS Brings Benefits 24
Metal Part Reps Obtain Quotes While On-Site 26
Flight Simulations Cut Flaws in Drone Design 28
Turnaround Time 29
College Chef Feeds Many With Micro's Aid 30
Computer Files Digesting Protein Combinations 31
User-Supplier Alignment Can Cut Software Costs ...32
Doll Trade Mere Child's Play With System 33
College Finds Basic Blocks for Growth in System ...34
Managers Use Desktop Terminal to Access Data ...35
Mortgage-Tracking System Cuts Costs 36
Decision to Try Unproven Package Pays Off 38
T/S Helps Multinationals Track Subsidiaries 42
Auto Decorator Logs On to Hold Profit Line 43
Perfume Firm Sniffs Success With System 44

EDITORIAL

Editorial: Time for a New Script 60
Softline: Micro Software/Hardware: Profit Picture ...61
Reader Commentary: Rethinking DP Ethics 61
Reader Commentary: Managing Employees 62
Reader Commentary: How to Identify Tech Writers ..65

SOFTWARE & SERVICES

Hero 2.0 Supports All MVS Versions 69
Packages Boost CICS Performance 70
Accounting Aids Out for 370, 4300 72
Cobol Task-Tracking System Bows 73
Version 3 of VAX/VMS Gets Adabas-M Support 74
Spreadsheet Software Out for IBM Series/1 Users ..75
Application Manager Out for Use With HP 3000 76

COMMUNICATIONS

Study: Activity Focused on Local-Area Micro Nets ..77
Northern Telecom SL-1 Adds Optional Features 78
Carterphone 9830 Terminal Burroughs Compatible ..82
Packages Integrate Micros Into Corporate Net 83
Modem Out for High-Speed Devices 84

SYSTEMS & PERIPHERALS

Year-Old DP Start-Up Offers Field 32-Bit Mini 85
Intelligent Visual Preprocessor Unveiled 87
CAD/CAM System Offers Desktop Display Unit 88

MINIWORLD

Specifics of Overview Offer Productivity Answers ...89
Turnkey Time Accounting System Bows 92

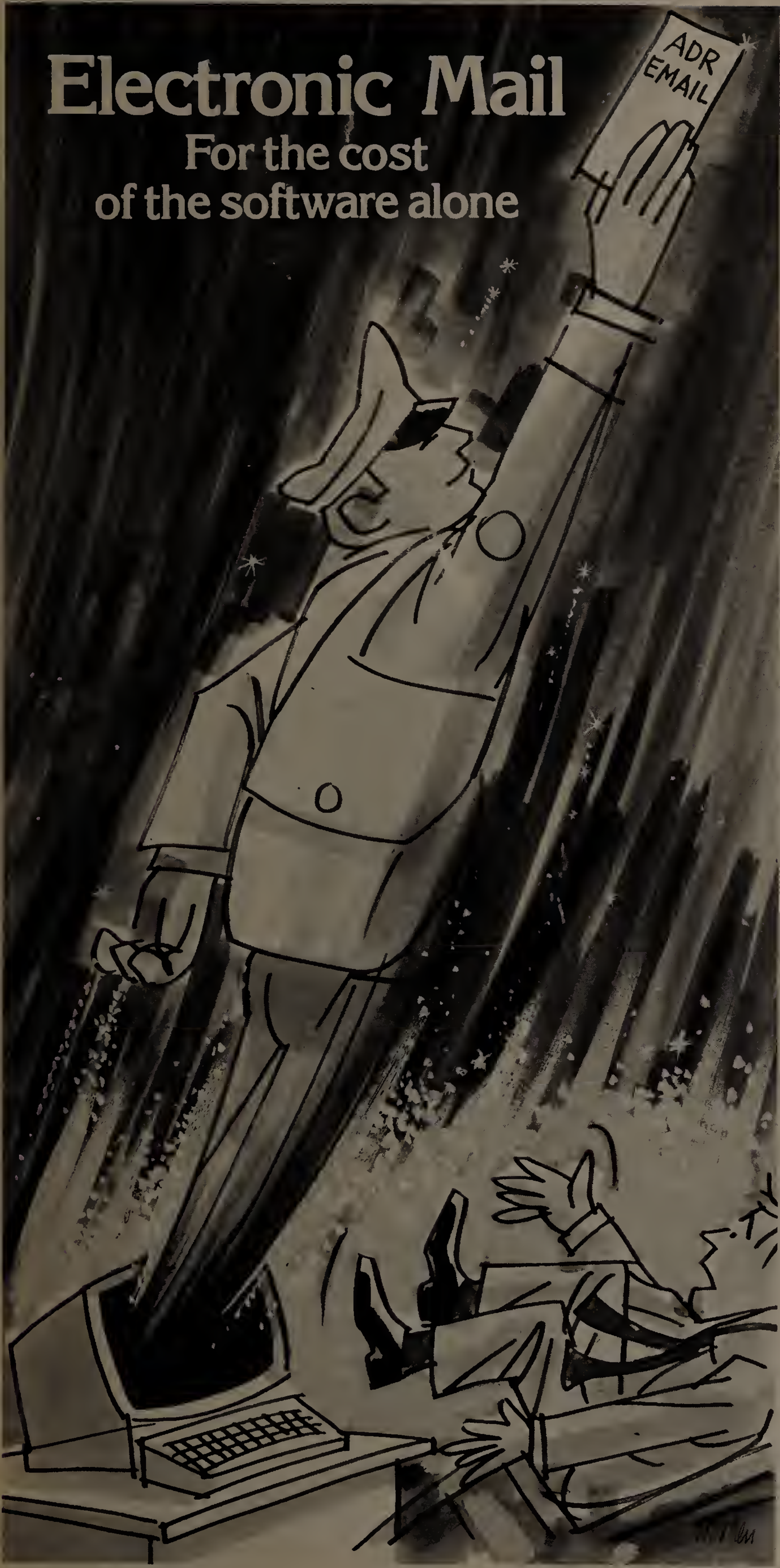
OFFICE AUTOMATION

What Do Secretaries Want in a Workstation? 95
DP Function Available for IBM Displaywriter 97

COMPUTER INDUSTRY

Intel to Provide IBM With 2164A Technology 99
Datapoint Earnings Down to $2.4 Million 99
XCS Now Marketing Xerox's 820-II Micro 101
Yourdon Steps Down as President 102
South Africa Experiences Explosion in DP 104
U.S. Service Firms Not Seen Abroad 106

ADVERTISING INDEX 142



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Vocational Schools — Part 2

Lack of Good Teachers Marring DP Education

Tens of thousands of students will enroll in vocational or college data processing courses this month. But will these courses sufficiently prepare them for an entry-level position in DP? And who will have a more difficult time finding a job — the graduate of a vocational school or the degree-carrying product of a four- or five-year college?

In this second part of a three-part series, CW Senior Editor Tim Scannell discusses some of the problems faced by both institutions, most critically — the quality of instruction. Next week, Scannell will look at who fares best at getting that first job.

By Tim Scannell
CW Staff

NEW YORK — While private vocational schools and colleges offering courses in data processing do not always share the same educational patterns, they do share the same goal: preparing students for entry into the computer industry.

Unfortunately, they also share the same problems: equipment that is outdated or lacking, inappropriate languages and a dearth of qualified teachers.

Ironically, most of these problems reflect the very nature of the industry that both educational pathways are trying to serve. The first two problems, although important, can be avoided through a little educational comparison shopping. The third — teacher inadequacies — is not always obvious but has the greatest potential impact on a student's future.

Outdated Equipment

While outdated computers can be a problem in a data processing course — they are not state-of-the-art, are prone to frequent breakdowns and usually cost more to maintain than they are worth — they are a fact of DP life. Architectures and systems in the computer industry change faster than the seasons.

Unfortunately, vocational schools cannot keep up with equipment changes because of the cost involved. If they tried, tuition costs would be astronomical, according to one source.

To resolve this problem, many vocational institutions resort to timesharing terminals that tie into large computers at local corporations or universities.

Colleges and universities usually receive equipment donations from large minicomputer or mainframe firms looking for a tax write-off, good public relations and an early exposure of students to their equipment instead of the competition's machines. However, many of these donated systems will be outdated by the time students trained on them graduate.

The U.S. government and private industry are trying to rectify the situation of old equipment donations by stimulating more firms to donate computers in exchange for sizable tax breaks. That is the focus of the Technology Education Act, also known as the Stark Bill, sponsored by Rep. Fortney H. Stark (D-Calif.) and aggressively promoted by Steve Jobs, chairman of Apple Computer, Inc.

The Stark Bill is presently before the House of Representatives, which is expected to pass it sometime before the end of the year; a similar bill is being considered by the Senate.

The problem of languages can easiy be resolved by a little homework on the part of the student. The majority of the vocational schools teach Cobol and Basic because those two languages are popular in both business and microcomputing, respectively.

The student must plan for the field he wants to tackle and take the appropriate courses.

One of the more serious problems, just now becoming obvious, is the dearth of proficient teachers. This problem is mainly attributable to the high salaries available to qualified people in the DP industry and the inability of educational institutions to lure them away from industry and into teaching.

Basically, students are only as good as their training — and the level of that training is steadily declining because of the lack of skilled teachers, according to a number of sources both in academia and the computer industry. Surprisingly, most of these inadequate teachers are involved in the data processing courses offered by colleges and universities and not the vocational schools.

"There are lots of new technologies coming out, and the industry is changing very rapidly. It's tough to keep faculty people and instructional material geared for the kind of things students need to know as far as employment is concerned . . . and to last them for a lifetime of employment," said Roland Spaniol, a professor at the University of Illinois and president of the Institute for Certification of Computer Professionals (ICCP). "Universities are really over a barrel, and one of the things that has gotten them over this barrel is the fact that they can't unload teachers they no longer need," he explained.

Spaniol has been involved in data processing for nearly two decades and has spent time on both sides of the educational fence — as an instructor and in industry, including a short stint as director of the University of Illinois computer center. He insists that many DP instructors are teaching what he calls "penmanship physics." They know enough about the computer basics to give bare-bones instruction, but do not delve into issues that will be needed in the real world.

Universities cannot get rid of these outdated teachers because they are full professors and entitled to all the protection of tenure. And they can't hire truly qualified teachers because they can't match the full-time salaries these people are commanding in the DP industry.

The big-name data processing vocational schools, on the other hand, can afford to hire qualified teachers from industry because students pay for vertical instruction and the schools do not always insist that instructors teach full-time. "They can go into industry and get a person who is working with the latest IBM buzz and is looking for a few extra bucks on the side, and they can have them teach that buzz to other people," Spaniol said.

Wayne Leroy, a regional coordinator with the American Vocational Association based in Washington, D.C., agrees that finding and hiring state-of-the-art teachers is more of a problem for universities than for vocational institutions. "When you don't have an adequate amount of dollars to operate from, you're forced into a situation where you're having to pay teachers less. So you get less qualified teachers," he said.

Leroy noted that a qualified computer programmer can "very easily" make $25,000 to $30,000 per year in metropolitan Washington. However, data processing or programming teachers on a college level are usually locked into a salary schedule of $10,000 to $12,000.

While the larger vocational schools have more money to hire more qualified teachers and can target their educational programs toward more specific areas in data processing, the smaller ones share universities' problem of declining teacher adequacy. In Boston recently, for example, some of the first graduates of the Computer Learning Center — part of a for-profit DP education chain operated by Airco, Inc. of Montvale, N.J. — complained that two of the school's instructors were not familiar with the teaching material and could not sufficiently communicate with the students.

No Clear-Cut Answers

There are no clear-cut answers to the problem of teacher inadequacy, especially since the pace of technological development in the computer industry shows no sign of slowing down to allow teaching to catch up with the real world.

Many colleges and four- or five-year schools, like Northeastern University in Boston, offer cooperative learning programs that allow students to spend part of their time in the classroom and part of their time in a DP job. Time on the job — arranged by contract between the schools and area companies — is counted as part of the student's degree work.

The National Association of Trade and Technical Schools (Natts), a professional organization based in Washington, D.C., offers a competency-based staff development program aimed at vocational instructors that consists of a series of workshops on the latest developments in the DP field. Material for the training seminars was originally

(Continued on Page 5)

Computer Camps, Club Med Boosting Students' DP Literacy

By Tim Scannell
CW Staff

It is like some technological Catch-22. Computer literacy, the goal for which colleges and vocational schools strive, is also the source of most of their problems.

Students entering four-year colleges and vocational schools today are not the same students of five or 10 years ago. Most, if not all, have been brought up in an age where the pocket calculator is a relic and the personal computer commonplace. They are more apt to know Basic and the particulars of Digital Research, Inc.'s CP/M than verb conjugations.

High school and even pre-high school students have a wide assortment of computer clubs and organizations that not only cater to people who were weaned on Pac-Man, but which provide a solid data processing education. For example, the Boston Computer Society — the largest nonprofit independent personal computer club in the U.S. — has more than 5,000 members. It president, Jonathan Rotenberg, is 19 years old and started the club about five years ago.

In the past few years, traditional summer camps — offering sun, fun and friendship — have been supplemented by computer camps that also offer sun, fun and friendship along with courses in microcomputer programming. Even Club Med, an organization offering vacation hideaways in secluded areas of the globe, has recognized the public's insatiable desire for computer literacy, and this year began offering microcomputers and training courses to guests at some of its resorts.

Approximately 4,878 high schools throughout the country offer five or more vocational education programs to their students — a good number of them related to data processing, according to Wayne Leroy, regional coordinator of the American Vocational Association. These students are familiar with the state of the art and know exactly what they want from a DP education.

Memorex Offers Thin-Film 3370, 3380 Rivals

By Jeffry Beeler
CW West Coast Bureau

SANTA CLARA, Calif. — Memorex Corp.'s long-expected entry into the thin-film technology arena became a reality last week with the introduction of the company's first disk subsystems to compete head-on with the IBM Models 3370 and 3380.

The larger of the two subsystems is the 3380-compatible Model 3680, which boasts a single-spindle architecture that reportedly allows users to configure disk-module strings consisting of either odd or even numbers of spindles. The other thin-film subsystem is the Model 3690, a 3370 replacement that has already been shipped overseas but has yet to be made available in the U.S.

Memorex intends eventually to sell the 3690 domestically, but it refused last week to commit itself publicly to a specific timetable.

Capable of transferring 3M byte/sec and said to boast an average access of 16 msec, the 3680 consists of three basic components — a 3888 storage controller, a 3683 string controller and a 3680 disk module. Like their IBM counterparts, each disk module holds 1.26G bytes.

Up to eight of the modules can be tied together to form a string with eight spindles and a total storage capacity of 10.08G bytes:

The 3690, by contrast, consists of two components, a 3693 controller and a 571.3M-byte 3690 disk storage module, which incorporates two independently addressable actuators and one head-disk assembly. Memorex credits the 3690 subsystem with transferring 1.86M byte/sec and rates the product's average access time at 20 msec.

With the larger of the two Memorex disk subsystems, a minimum configuration requires a 3683 string controller and two 3680 disk modules. Because of the subsystem's architecture, users can expand their minimum configurations with as few or as many spindles at a time as they please.

The 3680 is thus said to provide better configuration flexibility than subsystems using a dual-spindle architecture, which permits a user's spindle count to be increased only in even-number increment.

With the 3680 subsystem, each 3888 controller comes with two independent directors, each of which can support up to two full strings. A single string can consist of a 3683 string controller and up to eight 3680 spindles.

A 3683, in turn, supports two independent data paths that connect to the 3888's directors. The string controller also provides a maximum availability path selection feature that allows each path to control all its accompanying actuators.

A configuration consisting of a 3683 string controller and two 3680 disk modules costs $116,050. A 3888 lists for $78,790.

Shipments of the 3680 subsystem are slated to begin within the next six or seven months from Memorex at San Tomas and the Central Expwy., Santa Clara, Calif. 95052.

Tools, Teachers Mar DP Courses

(Continued from Page 4)

developed by Ohio State University's National Center for Research in Vocational Education and is considered the standard for vocational education, a Natts spokesman said.

People already involved in computing are doing their part through professional organizations such as the ICCP, whose goal is to lift data processing to the professional level now shared by doctors and lawyers. The ICCP does this by offering an intensive testing program that leads to a Certificate in Computer Programming. About 24,000 programmers are currently certified by the organization, ICCP President Spaniol said.

The Last to Know

Unfortunately, like a negligent father, the computer industry is the last to know about the problems of its struggling siblings. Accustomed to an endless flow of talented people from both colleges and vocational institutions, corporations that hire DPers are now waking up to the fact that the high-technology tap is closing. The bottom line is that the graduates are denied a quality education and the industry is denied the adequate talent.

At the Electro '82 convention held earlier this year, Ray Stata, chairman and president of Analog Devices, Inc. and founder of the Massachusetts High Technology Council, mildly shocked the mostly engineering audience by declaring that most U.S. companies and even the U.S. government have no long-range plans to sustain technological growth in the electronics and computer fields [CW, May 31].

According to Stata, the lack of quality education is the most dangerous threat facing the DP industry — one that could eventually undermine whatever lead the U.S. has on the rest of the world in electronics.

Spurred by this pronouncement and other indicators, the New England Board of Higher Education, a publicly funded group, met secretly two weeks ago to discuss the region's "sagging capacity to educate."

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IBM Fills Performance Gap By Bringing Out 3081-G

By Tom Henkel
CW Staff

RYE, N.Y. — Analysts repeatedly said IBM's 3081 Model Group D processor did not fit into the price/performance pattern set by the 3083 and 3081 Model Group K. IBM solved that apparent discrepancy when it recently announced a replacement processor, the 3081-G.

Like the 3081-D and 3081-K, the Model Group G is a dyadic processor available with main memory configurations of 16M, 24M or 32M bytes. IBM said the processor offers "slightly" more power than the 3081-D, but a company spokesman could not say exactly how much more power is available.

IBM stated that users of 3083-B processors can field-upgrade to the 3081-G. That means users of the 3083-E, the smallest member of the 3080 series, can field-upgrade up to a 3084 without going through a major hardware exchange.

A 3081-G processor with a 3082 processor controller and coolant distribution unit ranges in price from $3.54 million for a 16M-byte processor with 16 I/O channels to $4.09 million for a 32M-byte, 24-channel system, IBM said. The system leases for $128,045/mo and $133,515/mo, respectively; rental prices are $147,555/mo and $166,890/mo, the vendor said.

IBM Cuts Prices But Raises Rent Of 3081-D, K

RYE, N.Y. — In addition to announcing two new processors (story on Page 1), IBM cut prices on its 3081 Model Group D and K processors by up to 10%.

However, the vendor raised lease and rental prices on those same machines by 10% while decreasing the minimum monthly maintenance charges by up to 25%.

And in a move that analysts view as an appeasement to customers who are currently using 3081 Model Group D processors, IBM is offering a $200,000 price reduction on the 3081 Model Group D to Model Group K processor upgrade package. The same price decrease is available to users of the new Model Group G processor if those users decide to upgrade to a Model K processor before the end of the year.

The Model Group D- or G-to-K upgrade normally costs $600,000. Users can now buy that package for $400,000 if:

- A Model Group D processor is installed on or before Sept. 30.
- The effective date of purchase of an installed 3081 D or G is on or before Dec. 31.
- The processor upgrade package is ordered on or before Dec. 31.
- The processor upgrade is installed no later than Dec. 31, 1983.

Price reductions go into effect immediately. Lease and rental price increases go into effect Jan. 1.

System / Characteristics	3081-D	3081-G	3081-K	3084
Relative Performance[1]	465	500	675	1.282
Mips[2]	10	11.4	15	27
Memory Size in Bytes (Minimum-Maximum)	16M-32M	16M-32M	16M-32M	32M-64M
Purchase Price[3] (Memory Size)	$3,260,000 (16M)	$3,260,000 (16M)	$4,260,000 (32M)	$8,580,000 (64M)
Lease Price (Lease Term)	$110,485 (4 Year)	$110,485 (4 Year)	$147,520 (4 Year)	$315,620 (4 Year)
Machine Cycle Time (Nsec)	26	26	26	26
Channels (Minimum-Maximum)	16-24	16-24	16-24	48
Cache (Buffer) Size[4]	64K	64K	64K	64K
Bus Architecture?	No	No	No	No
Price per 1M Byte Of Main Memory	$25,000	$25,000	$25,000	$25,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; it is not a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and, therefore, cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. For the processor only. The 3084 is available only as an upgrade from a 3081-K processor. For example, a 32M-byte, 16-channel 3081-K processor costs $4,260,000. To upgrade that processor to a 3084, the user would have to add an 8-channel enhancement ($100,000) and a 3082 processor controller enhancement ($270,000). To upgrade to a 64M-byte, 48-channel 3084, the user must add a new processor ($3,680,000) and a 3082 controller/channel upgrade ($270,000). The actual upgrade cost for the processor only (not including extra power supplies, cooling units and other prerequisites) is $3,950,000.
4. The 3081 processors are actually two closely coupled processors with 64K bytes of buffer storage on each processor. The 3084 operates as four closely coupled processors with 64K bytes of buffer storage on each processor.

CW Chart

The New Lineup

IBM Unveils 3084, New Top of Its Line

(Continued from Page 1)

48M or 64M bytes of main memory.

The processor can be operated as two independent dyadic systems or as one four-processor system. An IBM spokesman last week could not say whether further partitioning of the processor — for example, dedicating three of the four processors to one task — is possible.

Running as two dyadic systems, the 3084's internal instruction rate is about the same as two 3081-K processors. However, when operating as a tightly coupled multiprocessor, the 3084's instruction rate is about 1.9 times that of the 3081-K in commercial and scientific environments, IBM said.

As a multiprocessor, the 3084 operates only under MVS/XA. In this operating mode, all four processors present a "single system image" to users while offering more efficient utilization of peripheral devices and data processing resources; according to IBM.

When operating as two dyadic processors, the 3084 can use either MVS/SP Version 1 Release 1.1 and above or MVS/XA. In addition, IBM's Virtual Machine/Extended Architecture Migration Aid can be used on the 3084 to assist in migration to MVS/XA, IBM said.

Controller Expanded

To support the 3084, IBM announced an expanded version of its 3082 processor controller. The 3082 Model Q is actually two controllers. In a multiprocessing environment, the second controller is used as a backup; in a dual dyadic configuration, one controller is assigned to each processor, according to an IBM spokesman.

Users who upgrade 3081-K processors to the 3084 must install a second set of support peripherals including a second 3087 coolant distribution unit, 3278 Model 2A console and 3089 power distribution unit, IBM said.

All major software subsystems available on the 3081-K, such as TSO, IMS data base management system, and CICS are supported on the 3084. Because IBM considers the 3084 a single-processor complex, customers pay only a single-processor fee for software, IBM noted.

The 3084 and 3082 Model Q will be available in the third quarter of 1983. The first 3081-G processors will be shipped later this month, the IBM spokesman said.

A 3084 processor with 64M bytes of main memory, the 3082 Model Q and a second coolant distribution unit costs $8.7 million, according to IBM. The system leases for $315,620/mo on a four-year plan and rents for $394,520/mo.

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Corrections

Icot Corp.'s Model 351, not Model 352 virtual terminal system, allows up to six different Ascii terminals or personal computers to emulate IBM 3270 terminals [CW, Aug. 30].

"Line of 4-, 8-Channel Muxes Features Dual Applications" [CW, Aug. 16] failed to mention that the price of Prentice Corp.'s 8-channel multiplexer is $1,995.

In "Relational Tools Aid DP Productivity, Codd Tells Data Base '82 Attendees" [CW, Aug. 2], a list of eight major features that a data base management system should provide was inadvertently reversed. In the article, Codd was quoted as saying that "relational systems support all of these, with some weakness in the last." He was referring to "integrity," which should have been the last feature listed. Instead, data storage, retrieval and update was placed last in the list, which implied that relational systems do not support these features.

Integration Right on Schedule

New IDMS Applications Modules Ready in '83

By Lois Paul
CW Staff

WESTWOOD, Mass. — Cullinane Database Systems, Inc.'s planned integration of applications and decision support software with its IDMS-1982 data base management system (DBMS) is moving along on schedule.

Last week, Cullinane announced that purchase control, cost control, order entry, master production schedule, accounts payable, accounts receivable, fixed assets, billing and pensions modules will be made available to IDMS users beginning in early 1983.

A parts list and catalog module is currently available, the vendor noted.

Application software that was slated to be tied into IDMS-1982 this year [CW, Oct. 5, 1981] has been made available as promised. This includes the Cullinane Integrated Manufacturing System, with its inventory, material requirements planning and bill of materials modules. In addition, the previously announced Customer Information Service is now available, and a general ledger module acquired from McCormack & Dodge Corp. will be shipped beginning next month.

Payroll and personnel modules utilizing IDMS, which currently are being developed by Information Science, Inc. [CW, Jan. 11] will be available by the end of 1982.

Bob Goldman, Cullinane's executive vice-president, explained last week that "from an applications standpoint, we are creating a series of modular applications put together in a matrix in a lot of different ways to solve different problems, as opposed to having a manufacturing system or a distribution system. The information for the decision makers can be gotten from what is current within the daily run applications stored in the data base.

True Data Base Applications

"What is different about these applications," Goldman continued, "is that they won't run without IDMS, which means that they are true data base applications. By building these applications using not only the DBMS but all the aspects of the data base — the dictionary, queries, report writers, application development tools and so on — some of the major problems that have always existed with applications, tailoring them to meet [a user's] own special requirements becomes a lot easier because the tools are underneath them."

Each applications module is priced between $50,000 and $75,000, Goldman noted. Cullinane Database Systems, Inc. is headquartered at 400 Blue Hill Drive, Westwood, Mass. 02090.

Software Eases Access to Data By 'Tell-A-Graf'

SAN DIEGO — The Data Connection, a set of four software products intended to connect computer data sources to its Tell-A-Graf computer graphics software package, was introduced today by Integrated Software Systems Corp. (Issco).

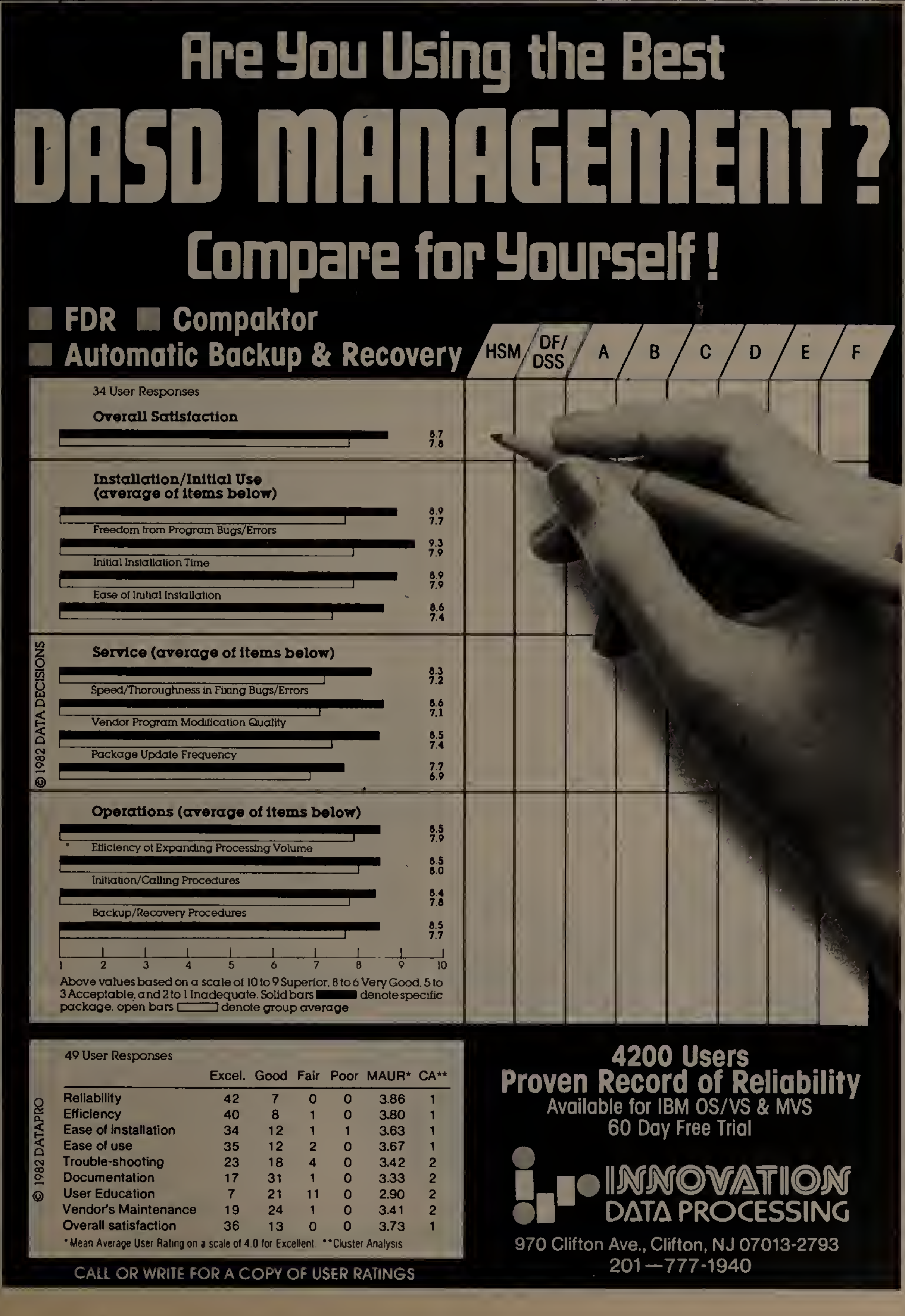
The Data Connection is intended for users of Tell-A-Graf on IBM and plug-compatible systems in MVS or CMS environments and Digital Equipment Corp. VAX-11 superminis. According to Issco, the software products can read and extract data from computer files or printer reports in any format, wherever they are stored; can link Tell-A-Graf directly to application programs; and can select, summarize, tabulate, edit and perform mathematical calculations to arrange data in a graphics presentation.

The vendor noted that the following four software products that make up The Data Connection can work independently or as a coordinated system:

- The File Connection was designed to read information stored in conventional file formats.
- Report Connection reads tabular data from reports and print files in any format.
- The External Program Connection, a set of subroutines and internal commands, directly links Tell-A-Graf software to user application programs.
- The Decision Support Connection edits, analyzes and modifies data to arrange it in a graphics presentation.

Deliveries of the four products are scheduled to begin Oct. 1. Purchased together, they cost $22,500 for IBM installations and $15,000 for VAX installations. Purchased separately, they range in price from $5,500 to $9,700 each for IBM systems and from $4,000 to $6,500 for VAX systems.

An introductory price reduction of approximately 20% is being offered for purchases made prior to Dec. 15, Issco noted from 4186 Sorrento Valley Blvd., San Diego, Calif. 92121.



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34 User Responses

Overall Satisfaction

Installation/Initial Use (average of items below)
Freedom from Program Bugs/Errors
Initial Installation Time
Ease of Initial Installation

Service (average of items below)
Speed/Thoroughness in Fixing Bugs/Errors
Vendor Program Modification Quality
Package Update Frequency

Operations (average of items below)
Efficiency of Expanding Processing Volume
Initiation/Calling Procedures
Backup/Recovery Procedures

Above values based on a scale of 10 to 9 Superior, 8 to 6 Very Good, 5 to 3 Acceptable, and 2 to 1 Inadequate. Solid bars ▬ denote specific package, open bars ▭ denote group average

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49 User Responses

	Excel.	Good	Fair	Poor	MAUR*	CA**
Reliability	42	7	0	0	3.86	1
Efficiency	40	8	1	0	3.80	1
Ease of installation	34	12	1	1	3.63	1
Ease of use	35	12	2	0	3.67	1
Trouble-shooting	23	18	4	0	3.42	2
Documentation	17	31	1	0	3.33	2
User Education	7	21	11	0	2.90	2
Vendor's Maintenance	19	24	1	0	3.41	2
Overall satisfaction	36	13	0	0	3.73	1

*Mean Average User Rating on a scale of 4.0 for Excellent. **Cluster Analysis

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Gsat Plans Satellite Network To Underprice AT&T by 30%

By **Phil Hirsch**
CW Washington Bureau

STAMFORD, Conn. — GTE Satellite Corp. (Gsat) will file a tariff "within the next few weeks" for a satellite communications network that it said will offer users private-line rates 30% below those charged by AT&T. The company plans to begin commercial service before the end of the year.

The Gstar network will initially connect Chicago, Houston and Los Angeles. New York will be added early next year, according to a spokesman for the GTE Telenet Communications Corp. subsidiary. By 1984, he added, the network will be nationwide.

Data will be transmitted at 4,800, 9,600 and 56K bit/sec, earth station to earth station. The proposed rates are:

- New York to Chicago and Houston to Chicago: $600/mo for 4,800 or 9,600 bit/sec service; $3,000 for 56K bit/sec service.
- New York to Los Angeles: $1,200/mo for 4,800 or 9,600 bit/sec service; $4,000 for 56K bit/sec service.
- For the remaining three city pairs: $900/mo for 4,800 or 9,600 bit/sec service; $3,500 for 56K bit/sec service.

In addition to these charges, there will be a one-time installation fee and a recurring monthly local loop charge.

Gsat contended that the rates proposed for Gstar, besides being 30% lower than those charged by AT&T, will be "lower than almost all existing tariffs of other common carriers for comparable service." A major reason Gsat can charge less, according to the company, is that its 7-meter (23-ft) diameter earth stations are located closer to the user.

The Gstar network will operate in the 12/14 GHz frequency band, which is relatively unoccupied at the moment, a company spokesman explained. He added that most existing commercial satellite services use the more congested 4/6 GHz band. As a result, these services usually must place their earth stations some distance from central business areas.

Another key feature of the new network will be the use of shared earth stations, the Gsat spokesman said.

However, a spokesman for Satellite Business Systems [SBS], also a satellite communications carrier, disputed both of these statements, pointing out that SBS offers shared services and has located its earth stations close to the central business areas in most of the cities it serves.

By 1984, Gsat expects to have 12 earth stations in place.

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Los Angeles	
IMS Master Technical Course	Sept. 27-Oct. 7
Master Terminal Operations	Oct 25-Oct 28
CICS	Nov 1-Nov. 5
ADF For IMS (includes lab)	Nov 8-Nov 12
Houston	
CICS	Sept. 20-Sept. 24
IMS Message Format (220)	Oct. 11-Oct 13
IMS Programming Series	Nov 15-Nov 19
IMS Message Format (220)	Nov 22-Nov 24
Master Terminal Operations	Nov 29-Dec 2
IMS Advanced Topics	Dec 13-Dec 17
Dallas	
Master Terminal Operations	Sept 20-Sept 23
VSAM	Oct. 18-Oct 22
IMS Programming Series	Nov 1-Nov 5
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IMS Advanced Topics	Nov. 8-Nov. 12
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CICS	Dec. 6-Dec. 10
Master Terminal Operations	Dec 6-Dec. 9
Portland	
CICS	Oct 11-Oct 15

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NAS Joins DDP Scrimmage

(Continued from Page 1)

control functions.

The DP-oriented processor supports the 370-type architecture and instruction set, while the network controller uses its own proprietary architecture and operates independently of its 4300-like counterpart, the spokesman said. The use of dual, dedicated processors enables the AS/1100's communications facilities to continue operating even if the system's DP capabilities are temporarily out of commission.

In processing power, the system is said to be roughly equivalent to the IBM 4321 and 8140. A minimum configuration incorporates 1M byte of main memory and 160M bytes of disk storage, expandable to 8M bytes and 3.2G bytes, respectively.

With the introduction of its AS/1100, NAS has reportedly gained the distinction of being the only vendor of IBM-compatible mainframes to provide a system for the fast-growing DDP sector. The product's only true competitors are the IBM 4300 and 8100 series, according to NAS.

First installed in 1979, the 8100 is geared mainly for office automation or similar applications and thus contains many features that make it easy to use, even for a relatively unskilled operator. However, the 8100 lacks compatibility with 370-series software and so is difficult to integrate into an existing IBM environment without extensive programming.

Just the opposite is said to be true of the industry giant's other DDP mainstay, the 4300 series. Though powerful and able to support existing IBM operating systems, the 4300 is oriented primarily toward programmers and thus is usually not suited to applications involving nontechnical end users.

The AS/1100 is said to combine the best features from both IBM DDP systems without suffering from any of their accompanying drawbacks. Like the 8100, the NAS machine is reportedly well adapted to nontechnical personnel and is equipped with many ease-of-use features, including extensive word processing and data entry capabilities.

In addition, the AS/1100 requires no system generation and, if necessary, can be programmed or otherwise supported entirely from an organization's central computing installation, the spokesman said.

Like the 4300, the NAS system is also optimized to support programmers and comes wih assorted software development features, including:

- Compatibility with Ansi 74 Level 2 Cobol.
- A screen mapping facility that remains independent of a user's programs.
- The ability to gain access to the distributed processing machine from any authorized point in a communications network.

Another of the AS/1100's programmer-oriented features is that the product, unlike IBM's CICS and other on-line application subsystems, integrates its transaction-processing software with its operating system. The result is that programmers can write transaction programs without having to learn CICS commands or macro-level programming skills, the spokesman said.

The merger of the AS/1100's transaction-processing capability and its operating system also eliminates a whole layer of software interface and thus minimizes the machine's operations overhead, he added.

A typical AS/1100 system configured with a 2M-byte CPU, two 160M-byte disk units, 12 CRT workstations and a 1,600 line/min printer costs $160,000.

The system can be field-upgraded to larger members of its manufacturer's processor line and will become available in November from NAS at 800 E. Middlefield Road, Mountain View, Calif. 94043.

Goode Picks Some Winners

(Continued from Page 1)

to tonight's tilt between Dallas and the Pittsburgh Steelers. "I've got Dallas," he reported. By how much? "Probably a touchdown."

He cited the declining Steeler defense as a mitigating factor. According to him, when the team went to the Superbowl in 1978, it had allowed only 2% of opponents' passes to go for touchdowns. The following year it was 3.5%. In 1980, it was 4.5%, and in 1981 it was at 3.9%, the league average.

By contrast, in 1980 and 1981, Cowboy Quarterback Danny White scored on 6.3% and 5.1% of his passes, respectively, Goode noted. "This implies that on a key stat, there is a difference between Dallas and Pittsburgh if they play according to statistical form," he observed. "So I would say Dallas has the edge in the air."

On yards per pass attempt, Dallas also enjoys a statistical advantage. The Cowboys made 6.7 yards per attempt last year and Pittsburgh allowed 6.5, which is significantly above the league average of six, he commented.

Defensively, Dallas gave up 17.3 points per game last year, while Pittsburgh scored 22.3, a good omen for the underdog Steelers.

Goode said Dallas "should have" scored 26 points a game last season but only averaged 23. In spite of the fact that running back Tony Dorsett rushed for 1,646 yards, he only scored four touchdowns on the ground.

Meanwhile, Ron Spring, another Cowboy running back, scored 10 rushing TDs. Goode offered a possible reason: His contacts in Dallas tell him that they didn't give the ball to Dorsett in goal line situations.

Goode also noted that the Cowboys' touchdowns rushing per game fell, relative to the league, more than any other team, from 1.6 to .9 between 1980 and 1981.

"They were over league average in that stat in three games out of 16," he added.

Goode advised *Computerworld* readers to watch the fleet-footed Dorsett closely tonight. "I think that in the first Monday night game, we're going to want to see if Tony Dorsett scores on the ground," he said.

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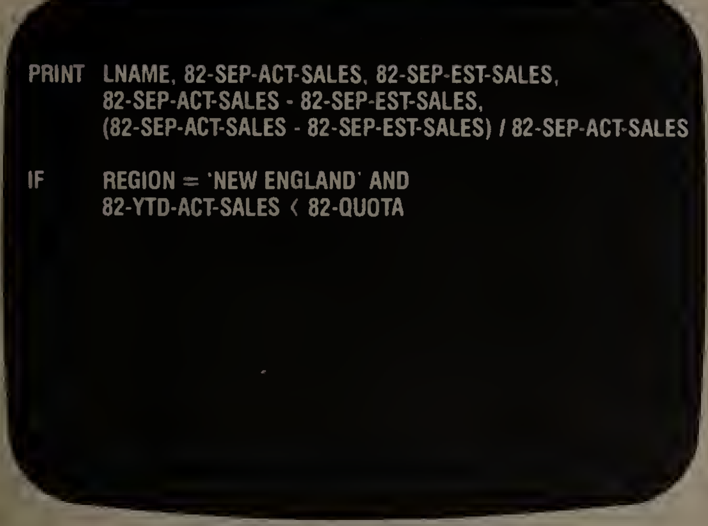

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PRINT  LNAME, 82-SEP-ACT-SALES, 82-SEP-EST-SALES,
       82-SEP-ACT-SALES - 82-SEP-EST-SALES,
       (82-SEP-ACT-SALES - 82-SEP-EST-SALES) / 82-SEP-ACT-SALES

IF     REGION = 'NEW ENGLAND' AND
       82-YTD-ACT-SALES < 82-QUOTA
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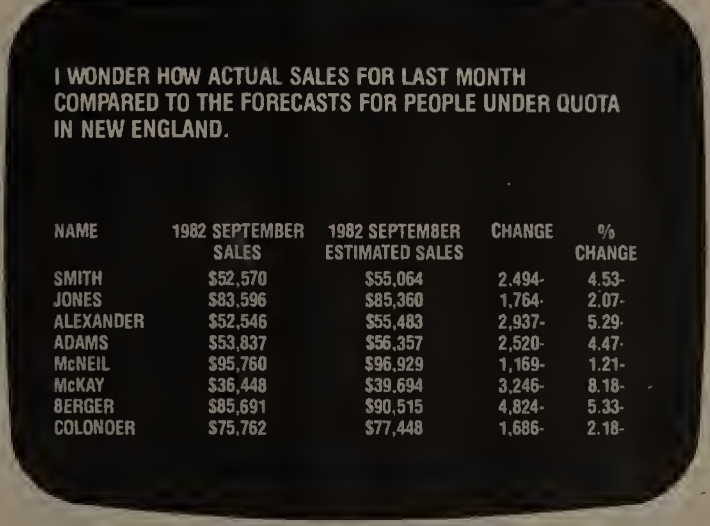

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NAME        1982 SEPTEMBER  1982 SEPTEM8ER   CHANGE     %
                SALES       ESTIMATED SALES           CHANGE
SMITH         $52,570          $55,064       2,494-    4.53-
JONES         $83,596          $85,360       1,764-    2.07-
ALEXANDER     $52,546          $55,483       2,937-    5.29-
ADAMS         $53,837          $56,357       2,520-    4.47-
McNEIL        $95,760          $96,929       1,169-    1.21-
McKAY         $36,448          $39,694       3,246-    8.18-
8ERGER        $85,691          $90,515       4,824-    5.33-
COLONOER      $75,762          $77,448       1,686-    2.18-
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Intellect isn't just for simple questions. The system can relate information from several files to respond to a query, so that a request doesn't have to be confined to a single file. Users can compare different sets of data with one question, as when comparing actual sales figures with projections. Managers make better decisions with all this information instantly available at their fingertips.

Many non-DP people think it's always been this easy to get information from a computer. That's why they get so frustrated when they discover that they have to learn a complicated formal query language in order to retrieve the data they need. If they have any experience working directly with a computer, they'll be amazed and relieved at how easy it is to use Intellect—even to get the answers to complex questions. Intellect makes the computer the easy-to-use tool it should have been long before now.

Eighteen months ago true English-language data retrieval was not even possible in everyday commercial applications. Although Intellect is a recent and dramatic development, it is already hard at work at over 100 installations in Fortune 500 companies. It has been hailed by publications such as *Business Week* and *Fortune* as the first product to put Artificial Intelligence to practical commercial use. Intellect is used in a wide variety of businesses, such as manufacturing, banking, insurance and retailing—because the system incorporates a lexicon tailored to the way your company does business.

Intellect's ability to understand English is so unique that leading software companies have arranged to integrate it into their product lines. Intellect is marketed by Cullinane Database Systems under the name "On-Line English." Management Decision Systems offers Intellect as "ELI—English Language Interface." Information Sciences markets Intellect as "GRS Executive". Intellect also interfaces directly to ADABAS, IDMS and VSAM, as well as dealing with sequential files.

You don't have to learn a complex formal language to talk to your computer any more. Intellect already speaks *your* language. We'd be delighted to hear from you.

Richard Bibaud, Vice President, AVCO Corporation's Systems Division, was immediately able to use Intellect's plain English capability to retrieve information from his company's computer.

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EMPTY SHELL SITES

Company	Sites	Size (Sq Ft)	Membership Limit	Usage Fee	Maximum Usage Period	Mailing Address
Data Processing Security, Inc.	Fort Worth, Texas	33,000	35	$1,000/Mo for 7 Years	No Maximum Limit Unless Other Disasters Occur	Data Processing Security, Inc. 200 E. Loop 820 Fort Worth, Texas 76112
	Indianapolis	16,000	15	$1,500/Mo for 7 Years		
Data Shield, Inc.	Greendale, Wis.	5,400	80	$1,800/Year Small Users $2,400/Year Larger Users	8 Months	Data Shield, Inc. P.O. Box 242 Greendale, Wis. 53129
	Bayview, Wis.	16,200	80	$1,800/Year Small Users $2,400/Year Larger Users	8 Months	
Eloigne Corp.	St. Paul, Minn.	28,800	60	$1,200/Mo for 1 Year $1,000/Mo for 3 Years $900/Mo for 5 Years $800/Mo for 7 Years	9 Months	Eloigne Corp. c/o Northern States Power Co. 414 Nicollet Mall Minneapolis, Minn. 55401
Emergency Computer Center, Inc. (ECC, Inc.)	Lenexa, Kan.	13,500	25	$750/Mo — $1,500/Mo, Depending on Space & Utilities Needed	6 Months	ECC, Inc. 10012 Darnell Lenexa, Kan. 66215
Western Southern Life Insurance Co.	Cincinnati	8,000	19	$1,000/Mo	6 Months	Western Southern Life Insurance Co. 400 Broadway Cincinnati, Ohio 45202
Wright Line, Inc. Data-Site	Rhode Island	12,000 Underground	60	$12,000/Year Lump Sum	6 Months	Wright Line, Inc. 160 Gold Star Blvd. Worcester, Mass. 01606
	North of New York City	8,091 Underground	60	$12,000/Year Lump Sum	6 Months	

CW Chart

Product Spotlight

Hot Sites More Prevalent

Disaster Recovery: Some Like It Hot, Others Cold

By Marguerite Zientara
CW Staff

For those convinced of the need for disaster recovery contingency plans, *Computerworld* has examined some commercial offerings of "hot sites" — fully equipped computer centers — and "cold sites" — empty shells in which you can install your own computer equipment.

The companies listed in the charts here are a representative sample of what is available in the U.S.; it should not be regarded as a complete list. The firms mentioned are those visited annually by Jerry Isaacson, director of the Educational Resource Center of the Computer Security Institute in Northborough, Mass.

Only one firm contacted requested that it not be mentioned in this report. The St. Louis-based cold site has "all the business [it] can handle," according to a spokeswoman.

The disaster recovery industry, which is just "starting to grow," according to Isaacson, offers almost twice as many hot sites as cold around the country.

Besides the amenities indicated in the charts, hot sites feature security, fire protection and telecommunications capabilities, to varying degrees. Security generally is very elaborate, including such things as card entry systems, 24-hour guards, motion detection systems, water sensors and/or closed-circuit television.

Fire Protection

Fire protection comes in the form of heat sensors under the floor, smoke and fire detectors, wet or dry pipe sprinklers and/or Halon extinguishers. Telecommunications capabilities generally offer data rates up to 9,600 bit/sec on as many as several hundred phone lines.

The empty shells feature enough power, water cooling and air conditioning to run a large-scale mainframe. The empty shells' telecommunications capabilities are comparable with those of the hot sites, as are their security and fire protection measures.

But where does the computer equipment come from for a cold site? The user must make arrangements with its vendor for quick delivery of replacement equipment in case trouble occurs.

It is noteworthy that the length of time for which a user can run its equipment at a cold site is in most cases negotiable, depending on circumstances. While hot sites generally are stricter on their maximum usage periods, a number of vendors indicated users could stay indefinitely "unless there's another disaster."

Computer Alternatives, Inc. offers, in addition to its two New Jersey hot sites, a "matching" service for companies interested in "pseudo-mutual-aid agreements." Instead of the two companies pledging their facilities for each other's emergency use, Computer Alternatives arranges for only one firm to promise emergency facilities, secured by cash rather than a return pledge of assistance.

Computer Alternatives matches firms having contingency needs with compatible installations that have excess capacity. It conducts regular testing of the contingency plan and makes sure the operations remain compatible.

With 38 host sites and more than 30 clients, Computer Alternatives charges $1,200/mo to $2,000/mo for its matching service. It claims to have handled 15 disasters over the last five years, ranging from "an employee who poured half a gallon of sulfuric acid down a CPU" to a 10th-floor flood caused by broken pipes, according to its president, Joseph Zein.

Another option — for Honeywell, Inc. users — is the Crashgard service from CRA, Inc. of Phoenix, which promises to hold equipment on standby and ship it to a disaster site "anywhere" within 24 hours."

Fees vary depending on the equipment desired, a spokesman explained. For a Level 66/20 with 256K bytes of memory, three disk drives, tapes, card reader and printer, the cost is $1,500/mo on a three-year contract. Users are billed annually in advance.

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Company	Computer & Memory	Disk Storage	Tape Drives	Size (Sq Ft)	Uninterruptible Power System (UPS)	Membership Limit	Usage Fee	Minimum/ Maximum Usage Period	Shell Available	Address
Arbat Systems Ltd.	Four DEC PDP-11/70s (256K Words) 11/23 - 128K Words 11/24-256K Words 11/40-128K Words 11/44-256K Words 11/780-2M Bytes	200M Bytes Each 40M Bytes 40M Bytes 150M Bytes 210M Bytes 200M Bytes	6	2,500	No	4-Hour Response:10 12-Hour Response: 12	$300/Mo Minimum	6 Weeks Maximum	1,000 sq ft	Arbat Systems Ltd. Arbat Plaza Hoboken, N.J. 07030
Comdisco Disaster Recovery Services, Inc.	Chicago; Cranford, N.J.; Lodi, Calif. (Same Specs) IBM 370/158 Model 3 (2M Bytes) 370/168-I (8M Bytes) 370/168-AP3 (8M Bytes)	13.83G Bytes	16	Chicago: 37,800 Cranford: 17,000 Lodi: 18,000	No	100/Site	158-$1,500/ Mo 168-$2,000/ Mo 168AP- $3,000/Mo	6 Weeks Maximum For Hot Site 1 Year Maximum For Shell	4,000 sq ft All Sites	Comdisco Disaster Recovery Services, Inc. 6400 Shafer Court Rosemont, Ill. 60018
Computer Alternatives, Inc.	Elmwood Park, N.J. Univac 1100/82 (4M Words)	16M Bytes	6	4,000	No	36	$3,000/Mo—$12,500/Mo	8 Weeks Guaranteed Minimum	1,000 sq ft	Computer Alternatives, Inc. 555 Goffle Road Ridgewood, N.J. 07450
	Lodi, N.J. IBM 4341 Group 2 (4M Bytes)	3.5G Bytes	8	7,500	Yes	15	$2,000/Mo—$4,500/Mo	8 Weeks Guaranteed Minimum	2,000 sq ft	
Host Computer, Inc. (Subsidiary of Computer Alternatives & Marketing Agent For Acme & Cadre)	Acme Chain Division Of Incom International Corp. Holyoke, Mass. IBM 4331 Group 2 (2M Bytes)	2.3G Bytes	2	1,000	No	20	$1,000/Mo—$2,000/Mo	8 Weeks Guaranteed Minimum	No	Host Computer, Inc. 555 Goffle Road Ridgewood, N.J. 07450
	Cadre, Inc. Avon, Conn. Burroughs B4890 (800K Bytes)	130M Bytes	6	7,[illegible]0	No	24	$2,000/Mo	8 Weeks Maximum	1,000 sq ft	
Litton Systems, Inc. Mellonics Information Center	IBM 3033 (12M Bytes)	12.7G Bytes	14	3,400	No	80	$2,000/Mo—$4,000/Mo	6 Weeks Minimum	No	Mellonics Information Center 6701 Variel Ave. Canoga Park, Calif. 91303
NVIP, Inc. Systems Available For Emergency (Safe)	IBM 3033 (12M Bytes) IBM 370/158AP (6M Bytes)	11.76G Bytes	12	10,000	Yes	100/CPU	$1,000/Mo Minimum $2,500/Mo Average	8 Weeks Maximum For Hot Site 6 Months Maximum For Shell	14,000 sq ft	NVIP, Inc. 4850 Street Road Trevose, Calif. 19049
Remote Computing Corp.	Burroughs B7800 (6M Bytes)	5.5G Bytes	8	8,000	No	27	$500/Mo — $3,500/Mo	60-90 Days Minimum 6 Months Maximum	5,000 sq ft	Remote Computing Corp. 1076 E. Meadow Circle Palo Alto, Calif. 94303
Software Research Corp.	IBM 4341 Group 1 (4M Bytes) IPL 4446 Group 2 (8M Bytes)	3.81G Bytes	3	1,800	No	12	$1,500/Mo	1 Year Minimum Contract	No	Software Research Corp. 140 Gould St. Needham Heights, Mass. 02194
Sun Information Services Co. Sungard	Philadelphia I: IBM 3031 (4M Bytes)	508M Bytes	16	98,500 Philadelphia Total	No	80	$3,000/Mo—$5,500/Mo On 3 Year Contract	6 Weeks Maximum For Hot Site 6 Months Maximum For Shell	5,000 sq ft Philadelphia Total	Sun Information Services Co. 656 E. Swedesford Road Wayne, Pa. 19087
	II: IBM 3033 (12M Bytes)	1.52G Bytes	20		No	80				
	Chicago: IBM 3033 (12M Bytes)	1.52G Bytes	20	40,000	No	110			5,000 sq ft Chicago	
Sysgard, Inc.	Honeywell DPS 442 (2M Bytes)	2.4G Bytes	4	2,700	No	40	$3,000/Mo For 1 Year $2,750/Mo For 2 Years $2,500/Mo For 3 Years	90 Days Maximum	No	Sysgard, Inc. P.O. Box 1106 Owensboro, Ky. 42302

CW Chart

How Would You Recover From a DP Disaster?

(Continued from Page 1)

systems in which the only permanent records are those stored within a computer."

The study, whose results were reported in April as a publication titled "Computer Disasters and Contingency Planning," examined two dozen large companies in North America and Northern Europe. It found that nearly half had no formal backup arrangements of any kind.

With or without backup, data centers face threats from fire, smoke and noxious fumes, explosion and impact, flood and earthquake, loss of essential services, loss of key staff, terrorist attack or sabotage, the study said.

Losses manifest themselves in a number of ways: Direct financial losses result from destruction of equipment and facilities, loss of sales and loss of production. Indirect financial losses include long-term loss of customers, extra payments to staff, uncollected receivables, undetected fraud and payment of fines and damages.

Loss of control over vital aspects of the business can mean loss of the integrity of one's data or erroneous business decisions.

What can a data center do to guard against such losses?

- One alternative is to do nothing, which may be a "perfectly acceptable answer for a great many companies," according to the Butler Cox study. "By 'doing nothing' we mean taking out the appropriate forms of insurance, then accepting the risk that the computer system may be disabled for a considerable period, with all the inconveniences that would result."

The advantages of doing nothing lie in the cost, which is "next to nothing," the report pointed out. "It also saves management time . . . and it may avoid having to hire extra staff."

The disadvantage of following this course is the "genuine risk of business collapse and/or bankruptcy in the event of a full-blown disaster."

- Another alternative of disaster planning is the "fortress" approach, in which a firm places "all its eggs in one well-defended basket, in the form of a single fortress-like computer center," the Butler Cox said. Such centers have full redundancy in their hardware, good environmental controls and tight physical security.

While not cheap, the "fortress" approach costs less than any of the multicenter alternatives. The savings are in rent, facilities and staff. Other advantages are in ease of control and guaranteed security.

Again, however, the disadvantage of such a system is the possibility that "despite the best security, the entire center may be taken out of action by some types of disaster, such

(Continued on Page 12)

Product Spotlight

What's Available in Disaster Recovery Sites

(Continued from Page 11)

as a major flood, toxic chemical spillage or large-scale terrorist assault."

• Another major option, not mentioned in the Butler Cox report, is the commercial "hot site," which offers lease terms for an operational computer and peripherals, disk storage, telecommunications, environmental controls and security (see story on Page 10).

• The third option considered in the Butler Coxstudy is the "cold" backup service, or empty shell approach. This service offers lease terms on a site with no computer with sufficient electrical power, air conditioning and telecommunications to support one. Each subscriber to such a service pays an annual fee for the right, in the event of a disaster, to set up its computer in the center for a limited period of time — provided no other user is already there. Additional fees may be charged for the time the user actually occupies the center.

The cold site's advantages are its relatively low cost and high security. "For most companies, such a service is the cheapest way of obtaining a second computer center," the study said. "The subscription fee is a fraction of what a purpose-built building, equipped to the same standard, would cost."

Since the cold site is likely to be located at some distance from its customers, it is not likely to be affected by the same natural disasters, the report pointed out.

A cold site's disadvantages lie in "time scale," restrictiveness, shared membership and undercapacity, according to the report. By "time scale" the report means the difficulty in replacing lost hardware, especially custom-made equipment or equipment from manufacturers who have gone out of business.

The study found that most cold site agreements give a maximum of six weeks' use of a center, after which the user must vacate the premises, necessitating yet another move and more time lost.

Shared membership causes problems if a user needs a site only to find that someone else has moved into it. (However, some U.S. cold site suppliers indicated to CW that they can handle more than one user.)

Lastly, while a user makes sure the cold site will fit his needs during the initial subscription period, "it is all too easy to outgrow this . . . capacity gradually over time without realizing it," the study indicated.

• The report also discussed an option that does not exist in the U.S. — that of portable, prefabricated backup centers erected on a user-provided site in the event of a disaster. The advantage of this option is its simplicity. The disadvantages are finding space to erect a building; lack of air conditioning, heating or water cooling; obtaining equipment; and security.

The closest thing to a portable center in the U.S., according to Jerry Isaacson of the Computer Security Institute in Northborough, Mass., is the willingness of Randolph Engineering Corp. in Austin, Texas, to make available its product — trailers with air conditioning and raised floors — in an emergency.

• A fifth alternative is a "warm" backup service, according to the Butler Cox study. Warm backup refers to a contract with a service bureau to use its center in the event of a disaster. The user is also normally allowed to store backup copies of files and programs at the center for use in an emergency.

This is a time-saving alternative and offers good environment and security as well. The disadvantages are high cost; restrictiveness of use; potential capacity and compatibility problems; and lack of arrangements for any special requirements.

• The sixth choice considered by the report is that of mutual backup arrangements, in which two companies with similar DP configurations agree to back each other up if a catastrophe occurs. The companies are usually located near each other but are in different industries so as to eliminate risks to competition or confidentiality.

The advantages of such systems lie in low cost, flexibility and reliability and security. Disadvantages include the task of finding a partner, possible legal and contractual problems, capacity and system compatibility over time.

• The seventh option considered by the report is the private cold site, whereby a firm sets up its own empty computer facility with sufficient security and environmental controls at a safe distance from its primary site.

Such a site offers guaranteed access, relatively low cost (few ongoing costs and no extra staff), flexibility and no compatibility problems. The disadvantage — as with a commercial cold backup service — is time scale. "Although the private cold center itself can be activated immediately, the problem still remains of obtaining and installing the necessary . . . equipment quickly after a disaster," the report stated.

• The last option examined by the study is a private warm backup site, an approach that spans a wide range of options. Choices range from "having a cold center in which hardware is installed but left idle, to establishing a complete duplicate computer installation" running the same work load as the primary center and which can be "switched into service instantly."

The advantages of such a system are time scale, alternative uses (software development) and reliability. The major disadvantage is the high cost (this is the most expensive alternative) and possible loss of management and control, the study said.

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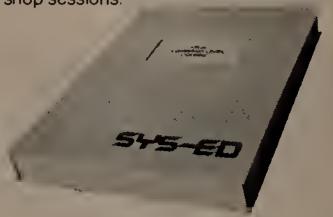

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Could Become Law by Default

Calif. Tax Bill Would Exempt Custom Software

By Jeffry Beeler
CW West Coast Bureau

SACRAMENTO, Calif. — Gov. Edmund G. Brown Jr. has until Sept. 30 to decide whether to sign into law a bill that would exempt custom programs from California sales tax.

Assembly Bill (AB) 2932 landed on the governor's desk on Aug. 30, shortly after clearing its final legislative hurdle in the state Senate.

Under California law, Brown must act on the proposed legislation within 30 days after it arrives in his office. Otherwise, the bill automatically becomes law.

Whether AB 2932 will ultimately win the governor's signature is still the subject of intense speculation. Brown is said by some local sources to have threatened to veto the bill on the grounds that it might deprive the state of sorely needed revenue.

But other sources estimate that the bill's chances of passage are slightly better than 50%. At least one AB 2932 supporter expects Brown simply to defer action on the proposed legislation and thus allow it to become law by default.

Introduced Last March

Introduced last March 2 by state Assembly Ways and Means Committee Chairman John Vasconcellos (D-San Jose), the bill would exempt California's software suppliers from having to pay sales tax on any program written to a single user's unique specifications.

Until the mid-1970s, efforts to collect California sales tax from suppliers of custom programs were virtually unknown, according to Intellidata, Inc. President Ron Carpenter, who also represents the Software Services Association, an industry group favoring AB 2932's passage. But when programs began to be increasingly implemented on magnetic media, the push for collections abruptly intensified.

Since then, the state has adopted a policy requiring all vendors of custom software to add a 6% to 6½% surcharge to the price of every product they sell to their customers. The surplus revenue is then supposed to be collected from the buyers and turned over to the state treasury in the form of a sales tax.

To ensure compliance with the regulation, the state's Board of Equalization runs periodic spot-checks on selected custom programs' suppliers and demands that the firms make their sales records available for special audits. A number of such companies have already been audited and have been found to owe the state several years worth of back sales taxes totaling tens or even hundreds of thousands of dollars.

Many other custom-software suppliers have managed thus far to escape the auditors' attention, but live in constant dread that someday they, too, may be scrutinized and will be ordered to pay massive deficiency assessments, Carpenter said.

If AB 2932 becomes law, California-based suppliers of custom programs would be immediately forgiven for failing to collect back sales taxes and would be relieved of their responsibility to pay any outstanding deficiency assessments.

The bill also contains a clause that says, in effect, that providers of custom programs should never have been required to collect sales taxes in the first place. In theory, the provision would give any custom-software company that had already been forced to pay sales taxes the option to apply for a full refund.

At least one AB 2932 opponent, Board of Equalization Chairman William Bennett, has warned the already financially troubled state that the refunds might eventually total as much as $90 million.

Bennett's dire predictions prompted some government administrators here to voice serious reservations about the bill, which had already worked its way through both houses of the state legislature. Shortly after it was sent to Brown's staff for final consideration, the proposed law was returned to the state Senate with a request for some last-minute revisions.

The maneuver resulted in the addition of an amendment that would limit the total amount of the state's sales tax refunds to $1.2 million.

Dema Conference Slated for Oct. 4-6

NEW YORK — The sixth annual Data Entry Management Association (Dema) Conference and Exhibition will be held Oct. 4-6 at the Sheraton Centre here.

The conference will cover topics relating to management techniques, new technologies and new opportunities for the future. Panel discussions will focus on an executive forum, centralized vs. distributed processing, participative management, new technologies and the office of the future.

Registration fees are $350 for members and $395 for nonmembers. Dema can be reached at P.O. Box 3231, Stamford, Conn. 06905.

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CW 9/82

Manual Tells How to Hire Handicapped DPers

By Bob Johnson
CW New York Bureau

NEW YORK — A "landmark" manual that describes how to hire the handicapped as computer programmers has been developed by a corporate communications specialist at Manufacturers Hanover Trust Co. (MHT) here.

Michael Krawetz, a DP documentation writer and journalist who used DP flowcharting methodology to write a previously published self-help "Self Esteem Passport" [CW, April 6, 1981], has mustered his computer savvy once again for a personnel guidebook. The Human Resources Center of Long Island described the book as "a landmark in the development of awareness among management persons and major corporate employers of the proper ways in which the sizable pool of computer programmer resources in the disabled population may be tapped."

The manual's concept became reality after MHT discovered that it needed management orientation in hiring and training the handicapped to serve as programmers, Krawetz said. Because Charles D. LaBelle, vice-president of human resources at the company, knew of Krawetz's work in applying flowcharting to publishing, he assigned the DPer to the task.

"Work on the manual began about a year ago, and it falls right in line with MHT's pioneering efforts in hiring the handicapped," Krawetz said. "The company has spent tens of thousands of dollars for braille terminals and on training the management force in recognizing the handicapped as a talented resource for DP," Krawetz said.

No Other Manuals

During his research for the manual, Krawetz approached nearly every organization in existence that offers aid in employment for the disabled and said he was unable to find a single manual that documented the hiring, training and placing of handicapped people in the DP field.

"To date I have talked to thousands of corporations who, to my disbelief, refuse to hire handicapped programmers. They just don't want to be bothered. I think a lot has to do with the fact that they are ignorant as to the precious human resource these people are, and how they can become a valuable asset in the DP work place," he said.

Krawetz described the handicapped population as the DP job resource of the '80s and said many companies that are experiencing a shortage of DPers would do well to turn to them for help. He pointed out that the disabled represent the lowest turnover rate of any category in DP and stay on the job an average of seven to 10 years.

Open Door

The human resources guidebook is written in a manner that non-DPers as well as DPers can understand. "This manual should open the door for tens of thousands of disabled persons who want to work as programmers," he claimed.

The manual is compiled from research that included interviews with many MHT handicapped DPers, which Krawetz feels gives the book more insight than traditional manuals. Tony Ferrita, a visually handicapped MHT programmer with three years of DP experience, described his experience in the manual.

Topics discussed in the manual include: "Interviewing Disabled Programmer Job-Applicants," "Visually-Impaired Programmers From Another Perspective," "Computer Training Programs for the Blind," "Specialized Equipment Directory for the Visually-Impaired Who Work as Programmers," "Supervising the Handicapped Programmer" and "Hearing-Impaired Programmers at MHT."

The 200-page-plus comprehensive manual also includes illustrations, references and a glossary. In the section on specialized equipment, for example, Krawetz discusses the ins and outs of computer hardware for the handicapped from braille terminals and printers to talking calculators.

The manual will be available by the end of the year, according to Krawetz. Those interested in the manual can contact Vice-President LaBelle at MHT in New York.

Course to Cover Data Security

PALO ALTO, Calif. — "Cryptography and Data Security," a three-day seminar conducted by Hellman Associates, Inc., is slated for three major U.S. cities: Los Angeles, Nov. 3-5; Palo Alto, Feb. 7-9; and Boston, May 4-6.

Seminar leader Martin Hellman, a professor of electrical engineering at Stanford University, will discuss the latest methodologies in data security and preventing computer crime. Hellman, who is known for his invention of "public key" and "trap door" encryption methods, was recently elected a fellow of the Institute of Electrical and Electronics Engineers for his contributions.

Seminar registration costs $795. Hellman Associates is at 299 California Ave., Palo Alto, Calif. 94306.

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Who Owns Information DPers Create?

Lawyer Sees Trade Secrets Suits Escalating

By Bob Johnson
CW New York Bureau

NEW YORK — Do DPers who work for computer vendors "own" the technological information they help create or learn on the job? And, more importantly, can they use what they learn at a future job?

These questions, which have been plaguing the computer industry for some time, are becoming manifest in a rash of legal battles between computer vendors and employees, according to Alvin M. Stein, senior litigating partner at the New York law firm of Parker, Chapin, Flattau & Kimpl.

Stein said in an interview here that the two major areas causing concern in both the legal field and the computer industry are formally known as noncompete restrictions and proprietary trade secrets.

Noncompete restrictions are usually agreements between an employer and employee that prohibit the employee from using any product knowledge he has gained at a competing company at a later date. The information itself is often considered a trade secret by the employer.

'Fertile Ground'

The computer industry has become "fertile ground" for litigation centering on DPers' rights and companies' rights concerning technological information and developments, Stein said. "Computer cases are becoming particularly appropriate concerning noncompete restrictions because the nature of the business involves the creation of a product which may not be generally or widely known," he explained.

Because computer products or services are so unique, it is often difficult to determine just what was developed by whom and how it was developed, Stein noted.

In contrast, when something is being developed in the manufacturing business, everyone usually knows what the product will be. In the computer industry, where products require numerous amounts of creative input, the proprietary rights are vague.

The conflict arises when an employee decides he wants to leave his job for another or wants to go into business for himself. The product involved frequently was developed by the employee and he takes with him only his own knowledge and expertise.

"In these situations," Stein pointed out, "the court is faced with whether the product was developed at the employer's expense, including the employee's salary thus belonging to him or whether the employee has a right to use the knowledge and expertise he has developed in gainful employment in another job."

When a product is in fact unique and the employer keeps it secret by holding access to it under "lock and key" as well as requiring confidentiality from customers, the courts would be inclined to protect the employer or proprietary creator, Stein said.

If an employee left his job and took with him physical evidence, such as a tape file, the courts are likely to enjoin him from using the knowledge in another capacity.

"Frequently, cases turn on whether the secret product was derived from the skills of the employee or from the information supplied by the employer," Stein said.

Case Example

Stein offered as an example of employee rights the case of Amoco Products Co. vs. Lindley, which was decided in Oklahoma Supreme Court in 1980.

According to Stein, the court refused to enjoin the employee from using the knowledge of software he created for better accessing probability of oil-rich exploration fields because it determined that the product was his own knowledge.

Noting another consideration important in deciding cases of this kind, Stein said that if the employee merely wants to work at a different job, the court will usually be sympathetic. However, if the employee was an officer of the company, the courts are more critical because an officer is believed to be in a position more likely to take advantage of what he has learned as opposed to being the developer of a new product, Stein explained.

To avoid problems of this kind, Stein suggested that employers should:

- Establish physical security measures to guard product secrets.
- Draw up confidentiality agreements with employees enforceable during and after employment.
- Formulate written warnings on the secrecy of a product.
- Preserve secrets by customers and new contractees.

As for employees, Stein advised that they not take with them any physical evidence of product development upon leaving a firm. That makes it possible for the employee to argue that all of the knowledge was his own.

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Food Firm Gobbles Costs With Hand-Held Units

ANAHEIM, Calif. — Saddled by sluggish inventory counts, snack-food maker Laura Scudder's turned to a data entry system that produced a 50% savings in manpower costs and time.

Counting corn nuts is a nightly task at Scudder's, since the company's very existence depends on the freshness of its potato chips, pretzels and other snack foods. Next-day production schedules must revolve around stock on hand, company officials said. And that means a fast, accurate count of the 400-plus product lines is a real necessity.

Yet the inventory process has not always been as smooth as the firm's natural style peanut butter. According to data systems manager Don Fingers, the nightly count often stretched long into the following afternoon before final counts could be reported.

"It took two workers using pencils and paper a full eight-hour shift just to count the products in the warehouse manually," Fingers recalled. "Their figures then had to be recapped by hand and finally transferred onto optical scanner forms.

"By the time the information was fed through our computers and reported back in a meaningful way, we were often well into the next business day," according to Fingers.

Realizing that nothing tastes worse than stale cheese puffs, Fingers set out to speed up the inventory process. The answer, he knew, was in bringing the computer power of his data processing center into the warehouse and eliminating as much human intervention as possible.

Hand-Held Terminals

His solution was hand-held terminals, a fairly recent innovation used primarily in direct order entry applications to collect data and feed it quickly to a mainframe for processing.

"We'd been using computers since 1968 for everything from payroll to distribution," he said. "It only made sense to extend the system to our nightly product counts."

The hand-held terminals — combined with a modem and receiver — seemed to provide the right method for conducting inventories and getting the information into a usable form quickly, Fingers said.

He called in several terminal makers for demonstrations, finally selecting a unit from Azurdata, Inc. Azurdata then recommended Processing Innovations' Speech-Aided Modem (SAM) as the link between terminal and host computer.

Efficiency Improved

The results became quickly apparent. "It now takes one inventory worker only four hours to complete the count," Fingers said, "a 50% savings in manpower costs and time. Although no studies have been conducted, we assume that efficiency and accuracy have been dramatically improved by the total elimination of manual number crunching.

"And now, when we get to the office in the morning, completed inventory reports are waiting for us on our desks," he said.

After collecting his data each night, the firm's inventory taker connects the Azurdata terminal by acoustic coupler to a warehouse telephone.

The terminal then transmits the data — up to 1,000 pieces of information nightly — to SAM, which responds in a computerized "human" voice with a positive status message such as "Data OK. Thank you."

SAM then transmits the data to Scudder's Hewlett-Packard Co. HP 3000 Series 3 processor, which compiles the information into inventory reports.

'Human' Response

With any receiver other than SAM, the inventory taker would have had to listen for continuous or broken beeps — or in extreme cases, call the DP center a second time — to confirm that the data had been correctly received.

In a noisy warehouse environment, these beeps can easily be missed or not understood, a problem eliminated with SAM's "human" response. SAM's voice also eases the transition for workers unfamiliar with computers and high technology.

"Our decision to use SAM really was based on the strong recommendations of the terminal manufacturers," Fingers said. "In addition, other receivers simply couldn't handle the terminal we finally chose." (In addition to Azurdata, SAM supports Micronics International, Inc., MSI Data Corp., Norand Corp. and Telxon Corp. equipment. Software programmed into SAM's microprocessor adjusts for different parities automatically, so a combination of different terminals can be received simultaneously.)

"Of course, SAM's voice response was a bonus," Fingers said. "The equipment has been very well received, both in the DP center and in the warehouse."

Fingers chose a SAM model that includes a CRT terminal, a Zilog, Inc. Z80 CPU, 64K bytes of dynamic random-access memory, speech synthesizer, receiver software and self-test diagnostics. The CRT terminal version, priced at under $5,000, can also act as a terminal for the host computer by displaying status information on its screen.

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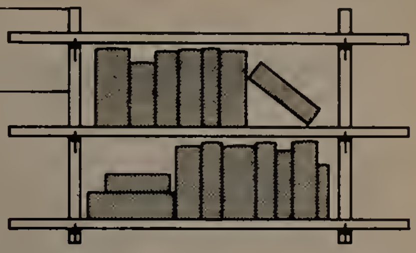

THE NEW ALCHEMISTS

By Dirk Hanson

Perhaps because it's California, where at least one Mercedes lurks in every high-tech parking lot, the Silicon Valley attracts attention. This book details how the industry evolved, especially in Silicon Valley, but does so without the usual awe and wonderment. This is an interesting, sensible account from a serious writer and high-tech journalist. Hanson has researched well and has interviewed a number of people, such as Robert Noyce of Intel Corp. While allowing the reader to draw his own conclusions, there are interesting observations and quotes along the way. One person he spoke to confided he had learned the secret of the business: "The only thing you have to know about the electronics business is that nobody's driving the bus." A good read.

Hardcover, 364 pages, $15.95, ISBN 0-316-34342-0. Little Brown and Co., 34 Beacon St., Boston, Mass. 02106.

THE ONE MINUTE MANAGER

By Kenneth Blanchard, Ph.D.,
And Spencer Johnson, M.D.

These authors, in just 111 pages, present a lucid strategy for increasing productivity, morale and your own goals. Managers at IBM, Lockheed Missiles & Space Co., GTE and Chevron Oil Co. cite success using "one-minute" goals and techniques such as, "Help people reach their full potential: catch them doing something right" and "People who feel good about themselves produce good results." The publisher is so certain these management skills work that it offers a money-back guarantee.

Hardcover, 111 pages, $15.00, ISBN 0-688-01429-1. William Morrow and Co., 105 Madison Ave., New York, N.Y. 10016.

DESIGN AND STRATEGY FOR CORPORATE INFORMATION SERVICES

By Larry E. Long

This book presents a management information systems (MIS) long-range planning methodology designed to gather and disseminate information effectively throughout an organization. It covers all planning areas, including hardware, software, application systems, personnel, management, operations, facilities and more. It is an approach that integrates traditional DP operations with the tenets of corporate strategic planning and allows for expansion to other departments and functions when necessary. The author has integrated the planning experiences of many MIS professionals with his own experience to create a book of, by and for managers.

Hardcover, 186 pages, $25.00, ISBN 0-13-201707-5. Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

MANAGING THE SYSTEM LIFE CYCLE

By Edward Yourdon

Yourdon's premise is that most projects tend to be over budget, behind schedule, unmanageable and ultimately of little or no use. He introduces a nine-stage software development methodology that allows managers to combine traditional management techniques — to plan, organize, direct and control — with technical skills. The nine stages are survey, analysis, design, implementation, acceptance test generation, quality assurance, procedure description, data base conversion and installation. Yourdon stresses adapting the life cycle to your own organization, where appropriate, and using common sense at all times.

Paperback, 144 pages, $27.00, ISBN 0-917072-26-X. Yourdon Press, 1133 Ave. of the Americas, New York, N.Y. 10036.

A GUIDE FOR SOFTWARE ENTREPRENEURS

By A.L. Frank

The author contends that there are many opportunities for industrious programmers to begin marketing their own software, but they often lack the basic business skills to succeed. This book concentrates on how to plan and market the software product, from characterizing entrepreneurial skills to business planning to sales and marketing. Several useful appendixes include venture capital, legal protection for software and how to offer seminars.

Hardcover, 190 pages, $29.00, ISBN 0-13-370726-1. Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

BRITTLE POWER

By Amory B. Lovins
And L. Hunter Lovins

America's energy system is brittle: vulnerable and subject to sabotage, technical failures and natural disasters, and terrorists know it.

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Hardcover, 486 pages, $17.95, ISBN 0-931790-28-X. Brick House Publishing Co., 34 Essex St., Andover, Mass. 01810.

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Scotland Yard to Battle Escalating Crime With

LONDON — Facing a sharply escalating crime rate, a dramatic surge in criminal violence and a generally growing "public order problem," police in Europe's largest city are preparing to strike back with their own array of technological weaponry.

By this time next year, citizens of Greater London dialing the familiar 999 police emergency number can expect a rapid response from the Metropolitan Police Force at Scotland Yard, thanks to a freshly installed computerized command and control system.

The system, according to Assistant Police Commissioner John S. Wilson, will put London's bobbies at the forefront of modern computing and communications technology. Additionally, the system, based around three Sperry Univac mainframes, will make it possible for police to handle the twofold increase in emergency calls projected for 1986, while the department reduces its communications work force by more than 20%.

As Wilson explained, the responsibilities of the Metropolitan Police have grown to prodigious proportions in its 153-year history. From its headquarters at Westminster Abbey and 120 local police stations, the force of 23,000 officers today patrols an area covering 787 square miles with over 7 million inhabitants. The existing communications system is simply inadequate to meet the growing needs of a modern police force, Wilson noted.

When a Londoner dials the emergency number, he is connected to an operator at a police exchange, who then requests the type of emergency service required. If it is police service, the call is routed to Scotland Yard.

As presently configured, the information room is staffed by 24 operators handling 999 calls exclusively. Messages are scratched down on paper and then placed on a moving conveyor belt that travels to eight radio operators down the line. Ultimately the message is broadcast both to a prowl car and a local police station in the area of the emergency.

Wilson said the system works efficiently with the present volume of 3,000 calls per day, but that figure is expected to jump to 6,000 within four years.

"Instead of doing a patchwork job of adding more telephone and radio consoles," said Wilson, "we decided to take a complete look at the entire communications complex and see what the latest scientific and technological advances had to offer us."

Wilson said the department wanted to achieve a faster response to crime occurrences, even if it amounted to only a few seconds because it is a "known fact that most arrests are made immediately after the crime is committed." So off went Wilson and his staff to a number of European, Canadian and American cities to view different police communications systems, determined to cull the finer points of the various systems they viewed and integrate them into a supersystem for London.

System requirements were then designed and sent throughout the industry in 1978 on a competitive tender, with the proposals by Univac deemed the most appropriate to the needs of the department.

New Mode

Under the new mode of operation, the operator receiving the 999 call will key in the details of the message on a CRT terminal. As soon as the operator adds the phone number the caller is speaking from, whether it be from a pay phone or private home, the mainframe will immediately work out a map reference. As the mainframe can access all London area phone numbers, it will decide in an instant whether the number given by the caller is legitimate.

When the message is completed, the communicator will punch a key to transmit it to the appropriate radio operator at his CRT terminal. Meanwhile, the mainframe will have already sought out the police car nearest the emergency. And by punching map references, the map of the area will be displayed and will aid the operator in directing any needed backup cars to the scene. Eventually all police vehicles will be equipped with a transmitter that will automati-

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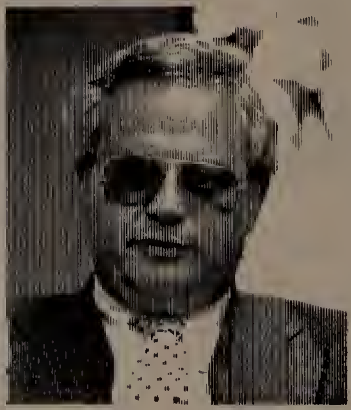

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Pansophic Meet Slated Oct. 10-13

OAK BROOK, Ill. — Pansophic Systems, Inc. will hold its second national Pansophic Users Learning and Sharing Exchange (Pulse) conference on Oct. 10-13. The meeting will take place at the Amfac Hotel and Resort at the Dallas/Fort Worth airport in Texas.

Plans for the conference include 50 user presenters and panel members and 60 sessions that will include both user presentations and product discussions.

The keynote speaker will be Dr. James L. Tunney, president of the Institute for the Study of Motivation and Achievement and a National Football League referee for 21 years.

The registration fee for the conference is $150. Details can be obtained by contacting Karen Taylor, National Pulse Coordinator, Pansophic Systems, Inc., 709 Enterprise Drive, Oak Brook, Ill. 60521.

Computerized Command and Control System

cally make the exact location of the cars known to the system.

The command and control system will be anchored by three Univac 1100/60 series CPUs, aided by the Univac V77-800 minis that will be the hub of the communications network, eventually to include 600 terminals.

Two 1100/61 systems, configured as a multiprocessor 1100/62 system, will be installed at Scotland Yard and the third at a communications center in North London. Each location will have three V77-800s, while other minis will be installed at the police facilities in Hendon, connected to the North London 1100/61 system and used for training purposes.

Both machines in the 1100/62 configurations will normally be in operation, sharing the processing load. But if one should fail, the other will be able to carry on handling the full load. In the event of a catastrophic failure of the 1100/62, it will be possible to switch to the third 1100/61, which could provide restricted service.

The 600 terminals in the network will be linked according to geographic location with the groups of V77-800 minis. The minis' function will be to act as communications concentrators to take some of the load off the 1100/61 mainframes. Only two of each group of three minis will be in day-to-day operation, leaving the third system as a back-up, according to Wilson.

The data communications network linking the minis to the mainframes will operate at a speed of 9,600 bit/sec.

Once the system is fully up and running the department will have direct connections with the Police National Computer, which is maintained by the home office for the use of all the UK police forces. This link will give immediate access to central files on stolen suspect vehicles, persons arrested for serious offenses, persons wanted or sought by the police for various reasons and fingerprint records.

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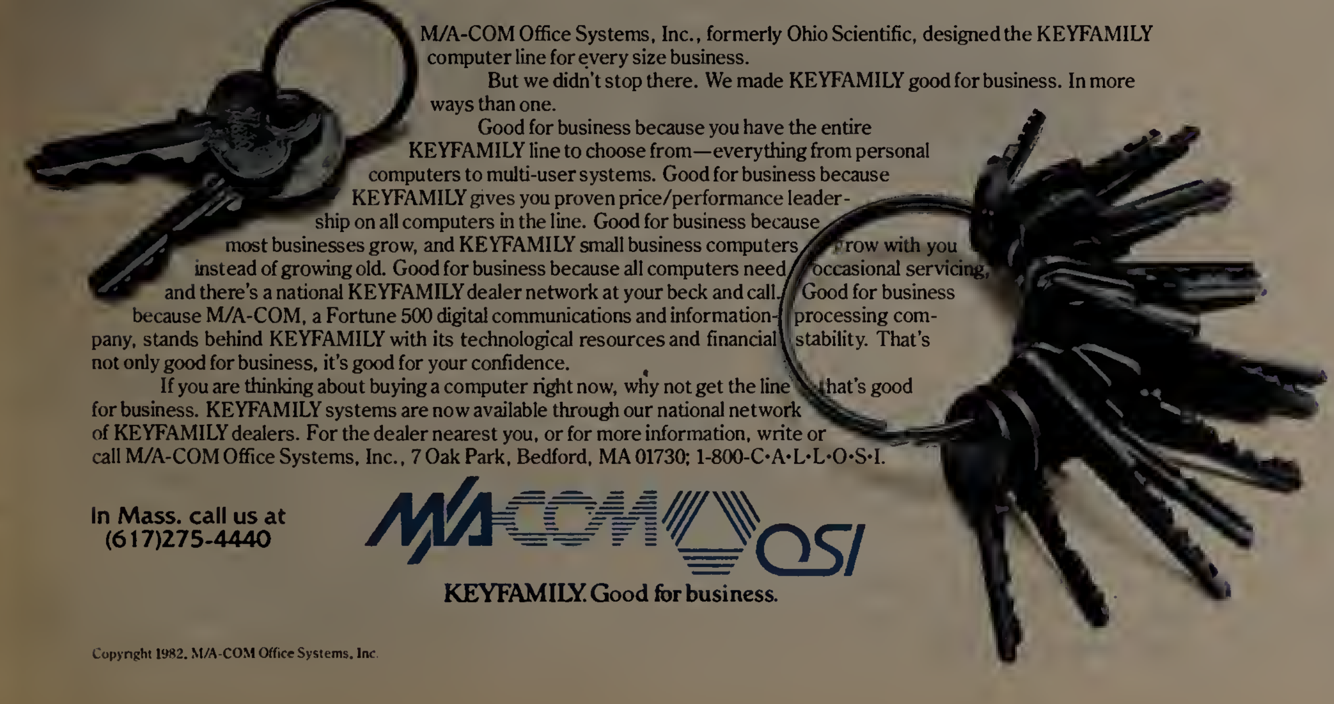

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Credit Union Credits Growth to In-House System

OGDEN, Utah — More than $1.5 million in savings has accrued in the Federal Employees Credit Union (Fecu) here over the last three years, thanks largely to the installation of an in-house computer.

The nation's 15th largest credit union grew by 15.5% in 1981 — its best year ever — and through the first half of 1982 was growing at a 27% annual rate, a spokesman said. A computer system that allows the organization to respond quickly to its fast-changing marketplace, while controlling operating costs, has been credited with a good portion of the credit union's success.

Quickness of response is the key to survival in the deregulated banking industry. Instead of just banks and savings and loans institutions, credit unions are now butting heads with Sears, Roebuck & Co., insurance and stock brokerage firms.

Trail of Liquidations

Reacting too slowly to industry changes has left a trail of liquidations and mergers within the credit union ranks. "It's a whole different world out there now," observed Rick Craig, the credit union's executive vice-president.

"To meet it we have to offer the same services, and we have to offer them quickly. Our DP system is the tool that will keep us competitive."

Traditionally, credit unions have opted to let service bureaus handle their DP needs. Financial data recorded on terminals by tellers was usually stored on a disk or tape and entered into the service bureau computer in batch at a later date. Credit unions paid banks or other financial institutions to provide other services such as share-draft processing.

Several years ago, a thorough cost analysis forced Fecu to reassess its DP environment. In 1979, the credit union purchased an on-line financial network built around IBM equipment.

In 1980, an IBM 4341 was installed at the operations center here. More than 130 IBM 3600 financial terminals located at 11 branch offices link tellers directly to the CPU.

Within the last year, three IBM 3614 automated teller machines (ATM) have been added to the system along with an IBM 3694 check processor that lets the credit union process its own share drafts.

"We have saved over $1.5 million in the first three years the system has been in operation over what we would have paid to the service bureau," Craig said. "And we have been able to offer a large number of services that we couldn't have offered without the computer system."

One new service made possible by the on-line system is the Security Fund, which competes against money market mutual funds and is federally insured. In its first year, the fund grew to nearly $46 million, with over half of that money representing new deposits for the credit union.

System software is the Comprehensive Credit Union System (Ccus), developed by Electronic Data Processing Corp. of Salt Lake City and marketed by IBM. Ccus incorporates all standard transaction types, account types, inquiry facilities and output reports used by credit unions.

The on-line system features a response time of three to five seconds compared with the previous 30-second delay. "With the slow response time on the old system, the teller lines used to run out of the doors," recalled DP coordinator Linda Souhrada.

Having all financial data available in the on-line system means that credit union managers can keep a closer rein on operations in order to control costs and increase profitability.

The systems software handles all standard credit union transactions, but credit union programmers can access the data files to create applications of their own. "Better quality control is now possible using the programs written by the DP staff," explained DP Manager Hugh Hadley.

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Accuracy, Timeliness Enhanced

Utility Saves With In-House Transfer Agent

JACKSON, Mich. — A projected annual costs savings of $58,000 was just one reason why Consumers Power Co. here moved its transfer agent functions in-house.

Consumers Power Co. is an electric and gas utility that services the major portion of lower Michigan. It currently has 175,000 shareholders of common stock, and 45,000 shareholders of preferred and preference stock.

Prior to bringing its money transfer functions home, it was issuing 100,000 certificates per year between two outside agencies. Once it became sole transfer agent, it was able to consolidate many of the denominations of its certificates, and now it issues only 50,000 to 60,000 certificates per year.

The change from an outside co-transfer agent to an in-house transfer agent was possible for Consumers Power because of the capabilities of the Corporate Shareholder System (CSS) software system from Informatics, Inc., which runs on the company's IBM 3030 computer system. According to Ronald D. Childs, the assistant secretary and general transfer agent for the utility company, "We had the computer capability and staff to handle these functions and we were receiving a large number of complaints from our stockholders, brokers and banks."

Childs recalled that Consumers Power had originally licensed CSS in 1970, and after years of upgrades, the company decided to install the on-line capabilities needed to bring its dividend reinvestment function in-house. By utilizing the full range of features of the system, the company has been able to successfully coordinate all shareholders' options into one unit, thus improving service to shareholders.

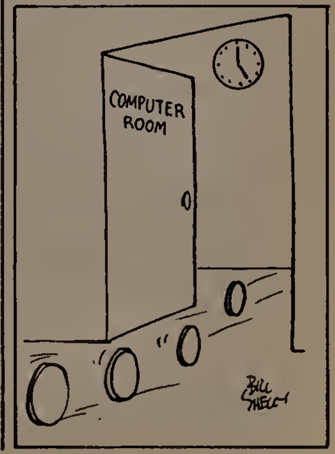
Accuracy and timeliness of the reinvestment transactions have been greatly enhanced, according to Childs, and greater flexibility is now possible because up-to-date information is available online. Through consolidation, the power company has been able to create and control a high level of service to its shareholders, Childs said.

Greater Rapport

By dealing directly with stockholders, Consumers Power has also been able to establish a greater rapport with them and to improve morale, Childs claimed. Because of the 48-hour turnaround time required to get certificates issued and back to New York to meet New York Stock Exchange requirements, transfer work must be completed by 1 p.m. daily.

Although this time constraint results in a heavy work load, Childs reported that the staff realizes the importance of their work and pulls together as a unit. He also said the company did not have to increase its staff of 15 to bring these functions in-house, primarily because of the capabilities of CSS coupled with a positive staff morale.

Part of the success of the implementation was due to strong partnership feelings between Informatics, the CSS User Group and Consumers Power, in Childs' opinion. He found the exchange of information that takes place among members of the user group a valuable contribution to meeting his company's needs and invaluable for planning the support for future needs.



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Nurses' Time Freed for Patient Care

Hospital Slices Stockpiling Costs With System

DES MOINES, Iowa — Individual departments at Iowa Methodist Medical Center here no longer have to stockpile large amounts of medical supplies since the hospital installed a computer system dedicated to supplies management.

A number of years ago, it was determined that Iowa Methodist's supply system was inadequate, according to Gerald Burger, director of materials management. "Since the hospital's inception," he noted, "a completely manual operation had been in effect. Most of the functions involving the supply department were literally carried out with a pad and pencil."

For a while, materials management tried to work with the already existing IBM computer that the DP department used to handle economic and patient care aspects of the hospital's operation. Ultimately, this alternative also proved unsatisfactory.

"In a hospital of this size, things like accounting, billing and patient history receive the most attention. In terms of computer time and availability, we just did not have a high priority," Burger observed. "It was generally agreed that we would have to come up with something else."

The possibilities were eventually narrowed to the following three alternatives: "We could try modifying the existing computer to meet our needs; we could go to an outside vendor for some sort of time-sharing arrangement; or we could go to a minicomputer that might eventually interface with the mainframe." Ultimately, the hospital chose the third arrangement.

Burger and his assistant, Gary Janssen, supply distribution manager, formulated a list of requirements they considered essential. Included were such functions as inventory management, purchasing and fiscal reporting.

"We were immediately impressed with Wang [Laboratories, Inc.]," Janssen noted. "While the competition could only promise three or four of the features we were interested in, Wang could provide 17 out of 20. We were also impressed with the flexibility of the machine. If the department decided to expand into different areas, the system could be expanded to meet these needs."

After visiting two similar Wang systems in Missouri and Illinois, the department chose Wang. The equipment was acquired in two installments. The first, delivered in August 1980, included a Wang 2200 Series MVP computer, an 80M-byte disk drive, five workstations, a daisy wheel printer and two matrix printers.

Satisfied with the initial system's performance, the department added one more 80M-byte disk drive, one 600 line/min band printer, two additional matrix printers and three workstations last November.

The Department of Materials Management is divided into five separate sections. The MVP assists workers in all five: warehousing, inventory control, central dispatch and customer service, purchasing and property management (maintenance).

The central dispatch and customer service section handles supply distribution in the main hospital. Formerly, each hospital unit was forced to stockpile large amounts of medical supplies.

Items like bandages, cotton, solutions and syringes were all stored in traditional supply areas and were the responsibility of a ward's nurses. In effect, these nurses were forced to devote a portion of their work day to the rudiments of supply.

Freeing Nurses' Time

The Wang 2200 system eliminated this process. "Each day a metal cart, designated for a particular floor, is stocked in the central supply area. The carts are then manually transported to their assigned positions," Janssen explained.

"Throughout the course of the day, nurses can remove supplies," he continued. "Articles like solutions, which must be billed individually to the patient, are tagged with a computerized sticker. A nurse removes the number, enters it into a cardex file and keeps track of consumption on a daily basis. At the end of a 24-hour period, each cart is transported back to the central supply area, where a clerk checks off depleted items on a standardized form and restocks the vehicle," he said.

The new Wang system saves a considerable amount of time. Nurses are now relieved from the supply function, which allows time for actual patient care. Supply orders and price changes are now handled on an immediate basis.

"The process frees revenue that ordinarily would be tied up for months. In a warehouse that contains approximately $600,000 worth of supplies, the computer has allowed us to cut back or eliminate $200,000 allotted to needless or overstocked materials. Much of this money was diverted toward the purchase of expensive operating room equipment that was formerly unobtainable," Janssen noted.

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Firm Finds Pooling Credit, MIS Brings Benefits

NEW HYDE PARK, N.Y. — The credit and management information systems (MIS) departments of the Julius Wile Sons & Co. division of Nabisco Brands, U.S.A. here decided to pool efforts to develop a computerized solution for credit and accounts receivable needs. The resulting system has brought benefits in both areas.

Don Perri, director of credit at Julius Wile, said that the system has helped his group realize a seven-day turnaround gain in monthly closings, as well as reductions in both charge-backs and day sales outstanding. The firm's MIS director, Don Krauer, cited the absolute control provided by the system audit trail and central information file and the improved data integrity through real-time file updates as the biggest rewards from his perspective.

"Two-and-a-half years ago, Julius Wile was growing into a large organization and there was a desperate need to update all the MIS systems," Perri explained. "I was given the option to look at an on-line system for our credit department, so I created a list of tasks I thought such a system should perform."

Perri and corporate MIS representatives subsequently met, and Krauer was assigned to design an on-line credit and accounts receivable management system for Perri's department.

Recognizing the advantages of using packaged solutions over in-house development systems, Krauer invited Perri to visit user sites of various software packages. Together they agreed that the Fortex Credit and Accounts Receivable Management System (Carms), marketed by University Computing Co. (UCC), best met their needs.

"The final step was to ensure that we were not going to purchase a package which was incompatible with the requirements of corporate and its other divisions," Krauer said. "Once this hurdle was overcome, a contract was signed with discounts for multiple data sites." Since then, five other Nabisco Brands corporate divisions have installed Carms.

Julius Wile's data center runs an IBM 3031 with CICS using Vsam. Its Imports Division, which was representative of the company's beverage business as a whole, became the first of five divisions to undergo conversion to Carms.

Phase 1 of the implementation called for accounting, MIS, credit and accounts receivable management teams to attend off-site vendor seminars to learn the theory of Carms. During Phase 2, credit and accounts receivable managers and their staffs attended two days of in-house training conducted by a UCC Fortex representative.

"We found Carms not only very logical and easy to install, but also very adaptable to what we were doing," Perri explained. Initially, Carms and the firm's batch system were run in tandem for close to six weeks. "Actual data conversion was our biggest concern, but in the end, we balanced both systems out to the penny; nothing was lost," he said. "Under the old batch system, we had trouble getting the final receivable numbers," Perri said. "This meant we would do our closings anywhere between the seventh and the 10th of the month and couldn't begin to crack down on receivables until close to the 15th. During the first month with Carms, we closed on the third working day and gained seven days in which to recover receivables and improve cash flow," he noted.

The information provided by the new system also has armed Perri's staff with additional information during their collection calls.

"We know the saying about the squeaky wheel getting the oil is true, because now with our system we can be a squeaky wheel which collects its accounts on time," he said.

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Data Center Enhancements Focus of Sept. 20 Course

AVON, Conn. — A four-day course designed to provide participants with practical methods to enhance the effectiveness, productivity and efficiency in the operation of their data centers will be presented by Computer Systems Research, Inc. Sept. 20-23, in Hartford, Conn.

The course is geared toward the needs of data center and technical managers, supervisors, operations personnel, planning staffs and users who are interested in the overall management of a data center.

The course will be divided into four segments emphasizing data center organization and functional responsibilities, personnel resource management, data center planning and objectives and the management of change and quality performance.

Particular emphasis will be placed upon providing participants with practical management concepts on organizing, planning, measuring and reporting systems and methods for managing the critical resources of the data center, the release said.

Participants are requested to bring data center or company organizational charts, blank job descriptions, performance reviews or performance logs used by their company.

Tuition for the four-day course is $600. Further information is available from Computer Systems Research, 40 Darling Drive, Avon Park S., Avon, Conn. 06001.

Oxford to Host User Group Meet Starting Oct. 7

ATLANTIC CITY, N.J. — Oxford Software Corp. will host its annual international user group conference Oct. 7-8 here at Harrah's Marina Hotel Casino. The theme of the two-day conference is "Securing the Fourth Generation."

Various topics of interest will be covered by working committees and in general session. In addition, new product information will be unveiled, according to Linda Baliman, program chairman.

The keynote address will be given by Richard Murch of the Technology Transfer Institute, who will speak on "Application Development Without Programmers." Featured as the second keynote speaker will be Alan Brill, director of professional services for Yourdon, Inc., who will speak on "Identifying Security Needs of Computer System Developers."

The registration fee for the conference is $300. Further information is available from Oxford Software Corp., 174 Boulevard, Hasbrouck Heights, N.J. 07604.

Codasyl Users Get Journal

OTTAWA — The Codasyl End User Facilities Committee has published its initial "Journal of Development," which is the committee's current version of specifications for an end-user facility.

The purpose of the journal is to open communications between the committee and members of the public interested in end-user facilities, according to a release.

The journal is available from the Canadian government for the equivalent of $10 in Canadian currency. All responses to the journal or comments on end-user facilities should be forwarded to Chairman, Codasyl EUFC, Box 1808, Washington, D.C. 20013. The publication may be ordered by writing to the Canadian Government Publishing Centre, Supply and Services Canada, Ottawa, Ontario, Canada K1A0S9.

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Metal Parts Reps Obtain Quotes With T/S System While On-Site

HOLLAND, Mich. — A manufacturer of custom metal parts here is using a computerized quoting system which enables sales representatives to provide accurate pricing information without leaving the customer site.

The Trans-Matic Manufacturing Co. uses a time-sharing system designed by Hewlett-Packard Co. to calculate prices based on specifications provided by the customer. A sales representative arrives at a customer location carrying a portable terminal with a built-in modem. He dials into the system located in Holland and enters the customer name, division, address and contact.

He then enters part names, numbers, thicknesses and material type, such as steel or brass, to describe the blank shape from which the part will be formed. The computer then asks questions based on that input. The representative types in standard codes to specify the work to be performed on the blank.

The computer calculates labor and material costs for the entire press process. It also includes quality control costs such as gauges and inspection time.

The base price in hand, the sales representative can then add other customer specifications, such as plating materials to be used, preparation and shipping schedules. The computer automatically figures shipping costs into the cost of the part. Finally, a sales commission is added, based on a formula built into the software.

"We do nearly 1,200 quotes each year," said Bill Stumpf, Trans-Matic vice-president. "I'd need at least two more people to handle that load if we didn't have this system."

Stumpf added that the computerized system lends credibility to Trans-Matic because it allows the customer to follow the quote step-by-step and because it ensures accuracy.

Even if the customer does not place an order, the quote is added to a master list.

CAM-I Conference Slated for Oct. 26-28

RENO, Nev. — Computer-Aided Manufacturing International, Inc.'s (CAM-I) 11th Annual Meeting and Fall Technical Conference will address the theme of "Beyond CAD/CAM — Extending the Limits." The conference will be held here Oct. 26-28.

General technical presentations beginning on Wednesday will cover applications in such areas as mechanical design, electronic design interfacing, facilities planning, numerical control and architectural engineering. Panel discussions will cover "Getting Started in CAD/CAM" and "How to Maintain Momentum in CAD/CAM."

The registration fee is $270 for CAM-I members and $370 for nonmembers. More information is available from Rhonda Gerganess, CAM-I Conferences, Suite 1107, 611 Ryan Plaza Drive, Arlington, Texas 76011.

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Testing Costs Reduced

Flight Simulations Cut Flaws in Drone Design

SAN DIEGO — For engineers at Teledyne Ryan Aeronautical Corp., the company that designed and built Charles Lindbergh's *Spirit of St. Louis,* there's no substitute for in-flight simulation.

For one thing, computer simulation of the company's target drones reduces the risk of unexpected design errors and produces a final test of system compatibility before the real thing is ever flown.

"It also cuts flight-testing expense," said Philip J. Wall, senior group engineer in charge of dynamics and simulation at Teledyne here. "Two men in the laboratory can perform a simulation while it takes 25 to 30 people to support an actual flight."

Examines Characteristics

With these economy and efficiency measures in mind, Teledyne Ryan Aeronautical installed a real-time system that lets designers examine complex aerodynamic and control characteristics of remotely piloted vehicles (RPV) traveling up to four times the speed of sound and at altitudes as high as 100,000 feet — all by simulation.

Engineers simultaneously evaluate advanced mechanisms and test the software algorithms that control them under simulated flight conditions. The simulator also trains pilots in RPV control techniques.

Used as targets for ground-to-air and air-to-air weapons, some RPVs have the flight characteristics of high-performance fighters and bombers, while others mimic supersonic missiles. In live testing, the vehicles are launched from the ground or from an airplane and fly missions either automatically or under control of a pilot in another location.

"It is necessary to simulate aerodynamic forces on the [control] mechanism in real time to determine true response characteristics," Mike Qualls, senior group engineer, said.

Teledyne uses a Digital Equipment Corp. Decsystem-1090 mainframe because of its strong time-sharing capability, company officials said. "We can run a real-time simulation, which may take 70% to 90% of the machine resources and still continue program development with the remainder," Qualls said.

The Decsystem-1090 has 128K bytes of main memory and two DEC RP04 disk drives with a total of 176M bytes of storage. Software includes the DEC Tops-10 operating system, Fortran-10, a Link, Inc. overlay loader, the Dibol Debugging Technique symbolic debugger and a Teco text editor.

A DEC PDP-11/40 minicomputer serves as an asynchronous front end to the 1090, providing communications for six CRT terminals, a Decwriter hard-copy terminal, a California Computer Products, Inc. drum plotter and a Versatec, Inc. electrostatic printer. Other peripherals include a TU10 tape transport, a 300 line/min LP100 printer and a card reader.

"Real-time simulation operates entirely from main memory with no swapping from disk," Qualls explained. "The data link provides a window between the 1090 and PDP-11 memories, permitting direct memory access between the two."

Variety of Converters

The PDP-11/15 drives a variety of digital-to-analog converters and receives response from analog-to-digital converters associated with the test fixture. Simulated flight data is recorded on oscillographic recorders on the engineer's console in a manner similar to telemetry data received from a flight test.

Initially the simulation is entirely computer based with no flight hardware involved. Preliminary hardware and software-control system designs are entered into the 1090 and tested against flight regimes in real time.

Engineers can simulate a launch, climb, cruise, turn, descent and recovery following a parachute-aided landing. At any point in the test where anomalies are detected, engineers can stop the test and adjust software parameters, then continue testing under the new conditions. Results are displayed in graphical form, printed and stored in the 1090 files for future evaluation.

While the systems designers are running simulations, the 1090 also permits application software development in the background. Programmers write, edit or modify the vehicle aerodynamics and flight-control packages to meet other test requirements.

As the design process continues, the microprocessor flight-control system and mechanical components are sequentially introduced into the simulation. At a later point, the 1090 is simulating only the structural vehicle and the aerodynamic conditions for the test.

In terms of flight testing of operating personnel, the system allows the operator to control the vehicle with a joystick while observing a large X-ray plotter containing a chart of the area over which the tests will be conducted. The 1090 interprets the control commands and responds with the characteristics of the test vehicle.

In this way, the pilot becomes accustomed to the RPV's idiosyncrasies on the simulator. As Wall said, "It's a lot better to crash a simulator than the real bird."

Free Brochures

- A free report comparing tools for the Hewlett-Packard Co. HP 3000 computer is available from Data Systems.

Among the tools compared are HP's Rapid group, including Transact, a transaction processor; Report, a general-purpose report writer; Inform, a high-level report writer; and Dictionary/3000. Quasar Systems Ltd.'s Powerhouse group of products includes the Qschema data dictionary.

Gentry, Inc.'s programmerless applications language, a high-level report writer; REX/3000, a general-purpose report writer; EZV, a screen handler in a REX program; and the DD data dictionary are also compared.

The "HP 3000 Productivity Product Comparison Report" is available from Data Systems at Suite 300, 11260 Roger Bacon Drive, Reston, Va. 22090.

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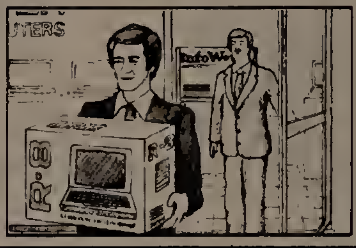

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How Do You Fight Personnel Cuts?

Turnaround Time

By Larry E. Long

Q **Profits are down drastically and management has opted for what it felt was the most equitable solution: a 25% across-the-board cut in personnel. To DP, this means a cut from 19 to 14. Since at least six DPers are actively seeking employment elsewhere, the reduction problem will solve itself.**

I've asked management to maintain the current level and to authorize replacements for those who are almost certain to resign in the near future. Management has rejected both requests and is standing firm on the 25% cut.

With attrition and no authorization to recruit replacements, we could be down to nine or 10 people within three or four months.

My concern is how we will provide the same services, maintain what we have and reduce our backlog of requests. Do you know of other DP departments that have successfully coped with an across-the-board cut in personnel?

A The state of the economy has dealt most of us a low blow. But based on my observations (not statistical evidence), the majority of companies that have been forced to cut back personnel have refrained from imposing any significant reductions on their DP departments. For the most part, the decree to DP has been to reduce the recruiting quota.

It is incumbent on you to explain to top management that you can't do X work with 19 people and X-plus work with 10 people. Unless a relational decision is made to at least maintain the status quo, certain DP-dependent operations are going to come to a screeching halt.

Q **My current position is services supervisor with an excellent company, but there is no future in this field. I have gained five years' supervisory experience in business while going to school, but no computer experience.**

Five years ago, when I was working toward a degree in information systems, all the magazines and newspapers touted the dawning of the information age and reported that the insatiable demand for programmers and DP personnel would outstrip supply for the next 30 years at least. Now that I've graduated, I hear and read that programmers are becoming obsolete. Distributed processing, packaged software and personal microcomputers are eliminating the need for DP personnel, while at the same time schools are turning out droves of people in information processing.

If you were starting your career today, would you enter a DP area like programming, systems anlaysis or data base management . . . or would you enter a user area like marketing or finance?

A I, like just about everybody else in the '60s, entered DP more through circumstances than through a conscious choice of alternatives. I started out as a systems engineer with IBM.

The information systems industry is in its infancy. I'm very optimistic about the career opportunities for bright, creative people entering the DP field. There are at least as many opportunities for people with degrees in information systems as there are in any of the functional area disciplines, save perhaps engineering.

The recession has forced many companies to impose hiring freezes, but DP is often singled out as the exception.

The complexion of the programmer job function may change radically over the next decade, but will it become obsolete? Never! There are untold numbers of applications that must be designed and programmed. Unfortunately, the information revolution is paralleled by a recession. Look for an information explosion and the demand for skilled DP professionals to be again insatiable.

Q **I just read your response to a question about management information systems (MIS) vs. computer science college curricula. Why is it that so few colleges offer degrees in business systems analysis and design?**

A Business systems analysis and design is a subset of MIS or information systems curriculums. At the undergraduate level, the student would normally take two or three courses in systems analysis and design.

A few colleges still offer degrees titled systems analysis and design, but I would expect them to be changed to MIS or information systems in the near future to reflect the breadth of the career field.

Long is a professor at Lehigh University, a DP consultant and author. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*

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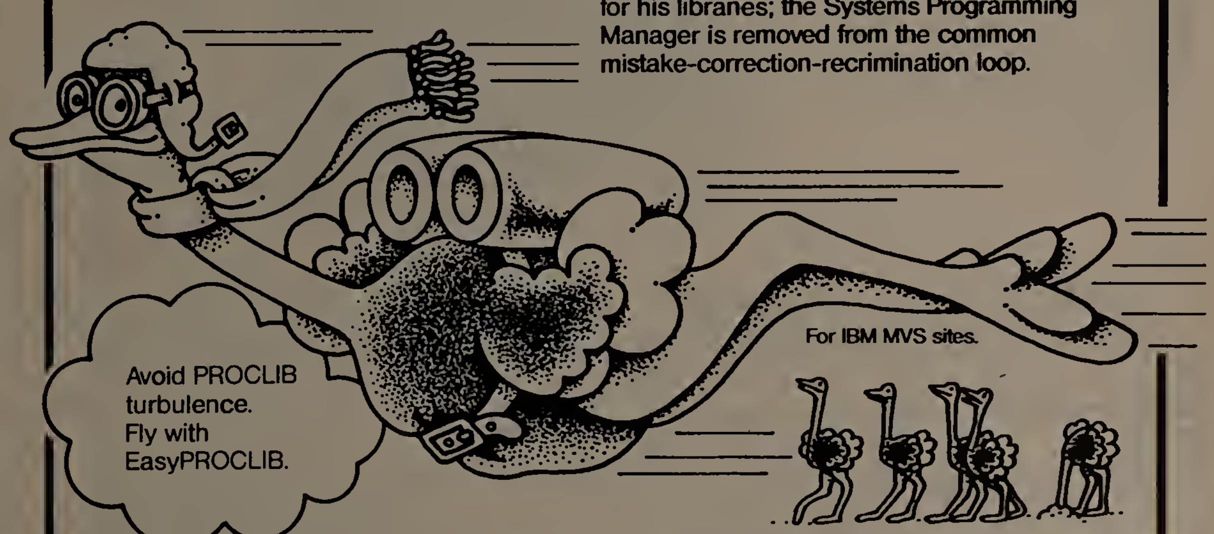
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Restaurant Management Program

College Chef Feeds Many With Micro's Aid

By Jim Bartimo
CW Staff

RIVER GROVE, Ill. — When families gathered for Labor Day celebrations last week, they had to conquer the problem of how to cook for a large group of people. But at Triton College's Hospitality Industry Administration Department here, a mainframe and a microcomputer teamed up to change a recipe for four into a meal for 44 with the push of a button — a trick that might have come in handy if unexpected members of the family had shown up for dinner.

Czechoslovakian-born chef Michael D. Klima, an instructor at the college, came up with the idea of a computer program that could instantly convert his recipes to serve large groups when he was the executive chef for Marriott In-Flight Kitchens, which supplies in-flight meals for such international airlines as Air Canada and Swiss Air.

When Marriott would not go along with his idea, he eventually left the caterer to teach full time, learn how to program in Basic and put his recipes onto an Apple Computer, Inc. microcomputer.

After conferring with Triton College's DP department more than a year ago, Klima hooked up a modem to the micro and transferred all 1,000 recipes to the college's Burroughs Corp. B6800 mainframe, where they are now accessed by students in the restaurant management program.

Klima drew his recipes from his experience as Marriott's chef, his job in his home country as chief chef for Czechoslovakia Airlines and from his four books on international cooking. He emigrated to the U.S. in 1968 when the USSR occupied the Eastern Bloc country.

How does Klima's computer program work? "A student is assigned to make beef stroganoff. He searches through all the beef dishes until he finds it. Then he punches in how many he is cooking for," and the program changes the proportions of the ingredients to fit the crowd, Klima explained. A task that would normally take up to a half hour is calculated instantly, he said.

The program will also calculate how much the meal will cost to prepare so a student or restaurant manager can figure the cost of cooking for different-size groups or project prices for a menu, Klima noted. An enhancement to the program will soon allow Klima to record which student cooked which dish and what his grade will be.

Added Benefit

An added benefit is that the student can print out the recipe and refer to it in cooking class, where cookbooks are easily soiled, Klima said.

Students currently prepare meals for the faculty and staff of 60 and other meals for the banquet room. The program prevents them from serving the same meals twice in one semester.

"It's not unusual anymore to see a computer in the kitchen," the chef said, pointing out that many large food service organizations are using computers for the same purpose. "When our students are looking for a job, they can say they worked with a computer."

"People are scared of computers because they don't know what they can do," Klima said of his unusual crossover from chef to programmer. "One day, every family will have one. The housewife will punch in what she has left in the ice box and the computer will tell her what she can make."

OA Seminar to Cover Facility Management

ANN ARBOR, Mich. — The Facility Management Institute (FMI) will sponsor a four-day seminar here Nov. 30 to Dec. 2, entitled "Office Automation: The Facility Management Perspective."

The seminar will explore reasons why new standards must be developed, how better standards can affect management's bottom-line in office automation, the assessment of future computer applications in white-collar work and existing national and international guidelines and standards for technology in workstations.

The seminar was designed to provide managers responsible for facility decision making and management with a method and sufficient content to develop and implement new facility standards to support the use of technology in office environments.

The registration fee is $500, FMI said from 3971 S. Research Park Drive, Ann Arbor, Mich. 48104.

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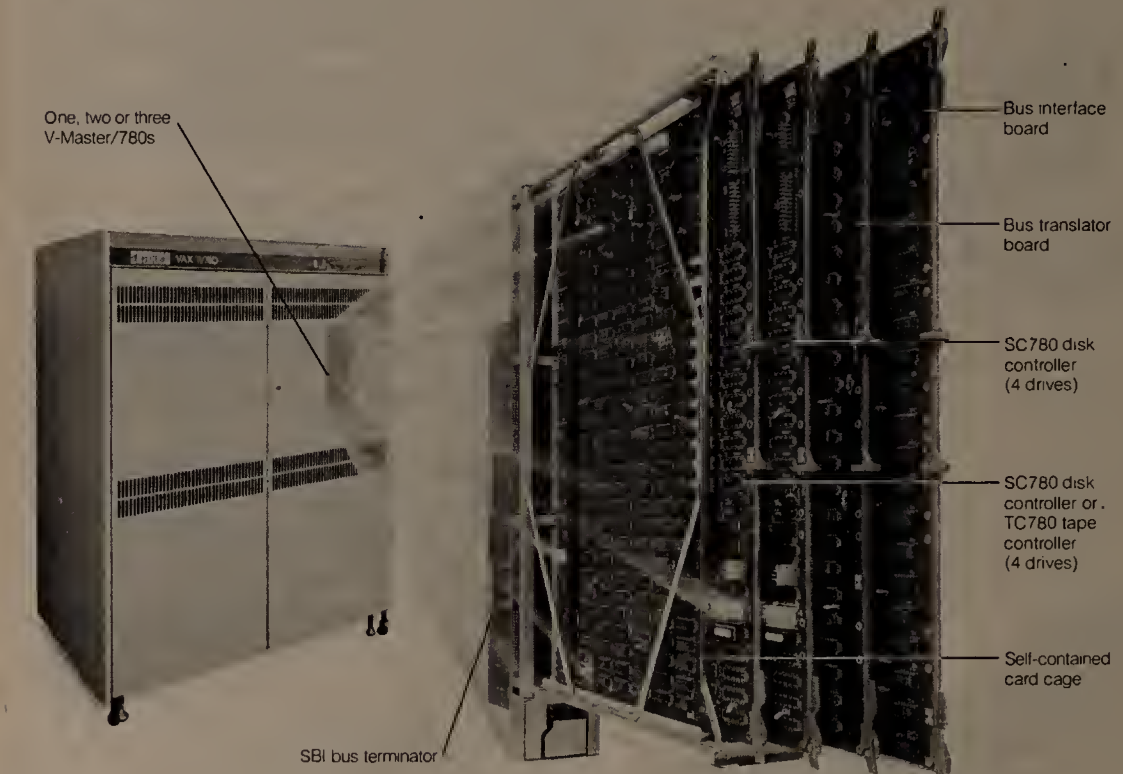
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Computer Files Digesting Best Protein Combinations

PHILADELPHIA — Two plants — neither of which are good sources of protein alone — may be greater than the sum of their parts when combined. So Drexel University instructor Stephen Dubin uses Digital Equipment Corp. PDP-12 and Prime Computer, Inc. Prime 400 minicomputers to figure out which of many combinations of wheat, flour, soy and other plants will provide a cheap, complete source of protein.

"The computer has a set of files called The Stomach," Dubin said of his program, designed to balance the essential amino acids in plants for efficient protein use in the body.

This source of protein would be beneficial for vegetarians, areas of the world where food is scarce and for patients in need of a controlled diet.

"I came upon the problem that people have with kidney problems who can't excrete proteins they don't need. You could live on a diet of meat every day because your body could excrete the extra protein it doesn't need. But someone with kidney failure couldn't do that. They need a controlled diet," he explained.

"If a kidney patient asked the hospital dietician how to alter his diet so he could have pizza and beer one day, the dietician would say, 'You can't.' It takes about 4½ hours to figure out a diet for a patient with kidney failure."

"I try to predict the body's reaction to different kinds of proteins and how efficiently it may use the protein," he said.

"I started out with this because I'm a vegetarian, and I'd often heard it said that vegetarians have a hard time getting enough protein," Dubin said.

While protein is more readily available in meat, different plants supply different amounts of essential proteins.

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Intro to Micros Offered to Execs

CHICAGO — Arthur Andersen & Co. will sponsor a two-day course introducing business professionals to microcomputers in several cities this fall and winter.

The course was designed for managers and executives who have little or no prior experience with microcomputers, but want to understand their potential in the business environment.

The courses have been scheduled to be held in Chicago (Oct. 18-19, Nov. 15-16 and Dec. 20-21); Dallas (Nov. 4-5 and Dec. 2-3); Washington, D.C., (Nov. 17-18 and Dec. 28-29); and San Francisco (Nov. 22-23).

The registration fee for the seminars is $500, Arthur Andersen said. Further information can be obtained from the Center for Professional Education, 1405 N. Fifth Ave., St. Charles, Ill. 60174.

Agency Insures Personal Computers

COLUMBUS, Ohio — The Columbia National General Agency (CNGA) has announced a comprehensive insurance policy for personal computer owners.

The insurance program, called Safeware, insures processors for a variety of mishaps including fire, theft and accidental damage, according to the firm.

An annual premium for a typical system consisting of a $3,500 processor, a $1,600 printer and $900 worth of programs costs about $60/year with a $50 deductable, according to the agency.

CNGA is located at Suite 1800, 88 E. Broad St., Columbus, Ohio 43215.

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CICS/VS Command-level Applications Programming CICS02 • Design, code and debug CICS/VS command-level application programs • Invoke program, file, terminal and data management services • BMS input/output mapping	4-8 18-22 25-29	8-12 15-19	6-10
CICS/VS Testing & Debugging CICS03 • Use program dump to diagnose abends • Apply Trace, Dump and EDF facilities • Testing techniques for CICS/VS environment • Program testing and debugging workshop	9/28-10/1	8-11	11/30-12/3
CICS/VS Application System Design CICS04 • Design systems that utilize CICS/VS facilities effectively • Use program, file, terminal and data management services • Format screens using BMS and 3270 IDS facilities.	12-15		11/30-12/3
DMS/CICS/VS Design and Programming DMS01 • Generate on-line applications • Utilize supervisor and system functions • Code calculation, edit, control routines • Apply panel hierarchy techniques	12-15		
DATA MANAGEMENT			
VSAM File Management & Programming VSAM03 • Design VSAM file structures • Use AMS commands to manage VSAM catalogs, data space, datasets • Create and use alternate indexes • Load, read, update and extend key or entry-sequenced datasets	18-22	15-19	
DATA BASE TECHNOLOGY			
DL/1 Applications Programming DL01 • Logical/Physical data base structures • Code DL/I calls to retrieve, update, add or delete segments • Build segment search arguments • Process status codes • Establish data base position	25-27	15-17	
IMS/VS Data Communications Programming IMS02 • Describe IMS/VS message flow • Code DL/I calls to send and receive single or segmented messages • Design and code conversational programs • Use batch message processing facility	28-29	18-19	
PROGRAM & SYSTEM DEVELOPMENT			
ON-LINE Application Systems Design SD02 • Define on-line system requirements • Develop specifications and controls • Describe screen design procedures • Manage on-line files/data bases • Describe communication network components	9/29-10/1	3-5	13-15
OS/VS JCL Advanced Features & Utilities JCL03 • Prepare, update and execute catalogued procedures • Code job restart procedures • Manage datasets • Select correct utility for specific function • Code JCL to execute utility	9/28-10/1		

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User-Supplier Alignment Can Cut Software Costs

By Neerja Sethi
Special to CW‡

Software costs have constantly been on the increase, both as a percentage of the overall DP budget and in absolute value.

Software budgets are increasingly coming under the ax, yet there is an ever-exploding demand for additional software from the users. This demand can be satisfied, provided software costs can be reduced.

Careful planning and an understanding of the reasons behind very high costs can give management the controls to bring these costs down substantially.

Why Costs So High

Several reasons are commonly advanced for continually rising software development costs. These include escalating manpower costs, costs associated with high turnover, constantly changing system specifications, low productivity due to the contention for limited computer resources between development and on-going activities and heavy overtime costs.

Management is hard pressed to control these costs and often finds itself unable to do so.

A closer look at the situation, however, reveals that these commonly perceived causes are mere side effects and are not the root of the problem. The real cause of the problem lies in the logistics of the development process itself, because conflicts are *inherent* in the goals of the various parties involved in the development cycle.

Regardless of the route chosen for the acquisition of a software product, there is generally a fundamental divergence in the objectives of the users and the suppliers. This divergence is clearly evident in the following commonly used modes of software installation:

- *Contract Programming.* The revenues of the contracting company are directly proportional to the duration of the project and the number of people it has working on the account.

The company has no incentive to deliver the product in the shortest possible time frame; its organizational makeup would be clearly biased toward extending the project to maximize revenue.

Also, the staff of these companies have no professional stake in the timely and cost-efficient implementation of the project.

- *In-House Development.* In most organizations, DP is a support function isolated from the mainstream of the business. Management has few tools to measure the productivity of DP departments or the efficiency of their services from a corporate standpoint. Company politics often create conflicts between users and support groups.

Projects are sometimes started prematurely — without a thorough analysis — to keep users content. For department heads, larger budgets have traditionally meant larger empires. Programmers, who get paid for working additional hours, can see no reason not to work extra hours, and are seldom rewarded for accomplishing a given task most cost-effectively.

The need to watch costs is seldom perceived. Heavy overtime is considered as evidence that an all-out effort is being made to deliver the product on time. Project slippage and associated cost overruns are considered normal.

One large organization monitors system development on weekly activity summary sheets. One of the items on the summary sheets reads, "Reasons for slippage."

- *Customized Packaged Software.* Packaged software is an attractive alternative because it can generally be acquired for a fraction of the development cost. This initial cost, however, can be grossly misleading and, in many instances, is just the tip of the iceberg.

Modifications are needed to customize the package and to make it compatible with in-house software. The customizing is normally carried out by vendor personnel at premium rates.

Management seldom makes an attempt to hold the vendor to a firm price; it settles for a ball-park estimate, which for obvious reasons is scaled down and often has no bearing with reality.

Software package vendors often have custom programming as a planned source of revenue; they are seldom rewarded for delivering the product under budget. Consequently, many customized packages end up costing several times the initial planned cost.

- *End-User Computing.* The users' lack of understanding of the capabilities and limitations of the hardware and the software can present serious problems. There is a tendency on the part of the user to view the problem from his narrow focus, without taking into consideration the impact on various interrelated activities.

The user cannot be expected to have a full grasp of various design considerations necessary for structured system development. Moreover, the system overheads of this process are substantial and the possibility of major disasters, due to ignorance, is very real.

Holding Down Costs

The key to holding down costs lies in resolving goal conflicts, by aligning the goals of the party installing software with the goals of management.

Management should concentrate on its main line of business and transfer the risk of any major development or enhancement effort to professional organizations that are in the business of supplying software.

Software houses will be forced to take up the role of professional risk

(Continued on Page 33)

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Mail Order Made Easy

Doll Trade Mere Child's Play With System

BIG SANDY, Texas — They were born on a used kitchen table in a small town of 1,100. They can't even stand up on their own, but Sue and Sam have a computer in their garage.

Sue and Sam, also known as Sunbonnet Sue and Overall Sam, are rag dolls. They're the basis of what has become a multimillion-dollar business for Jerry and Anita Gentry.

Back in 1975, Anita Gentry decided to try her hand at needleworking. She created Sue and Sam and decided to go into business selling the dolls as well as other needlecrafts under the shop name of Annie's Attic.

Since then, the business has literally consumed the Gentry's home and three others in their neighborhood. What used to be the family garage is now the computer room housing two IBM System/38 Model 5 processors with 2M bytes of main memory each. There is also a restaurant, gift shop and a newspaper, according to Anita Gentry.

Annie's Attic now employs 125 of the 1,100 local residents, the largest employer in Big Sandy. Through the firm's mail order business, hundreds of orders arrive at the Big Sandy post office each day. Those orders are filled using 40 IBM 5251 Model 11 terminals attached to the two System/38s, Jerry Gentry said.

"With the computer, we can find out anything anybody has ordered since 1977 [when the firm was using an IBM System/34 processor]," Gentry explained, adding that a mailing list of about 900,000 is stored in the processor.

At one point, before automating the operation, Gentry said there was about a six-week delay in processing orders. Now orders can be processed in a couple of days.

Labels are printed automatically, Gentry said, and the processor automatically calculates postal charges. As each order is entered into the system, the processor automatically posts the transaction to the customer's account and makes any necessary corrections to the firm's mailing list, Jerry Gentry said.

Since customers who sew don't necessarily crochet, the system keeps track of each customer's buying habits and can produce a segmented list for a target mailing. The system can also be used to spot trends, such as when the list of customers crocheting jumped from 20,000 to 100,000 during the first nine months of 1979. Likewise, the system can be used to monitor which ads get the best response and to keep track of inventory, Gentry said.

When customers phone in their orders, an operator can call up the customer's account on a terminal. In addition, the company payroll and general ledger is processed on the system, Gentry said.

"Everybody dreams of success, but I have to admit that my dreams never went to this extent," Anita Gentry said.

User/Supplier Alignment Lowers Costs

(Continued from Page 32)

takers in the developmental process. Their business will change from providing a service to supplying a well-defined product.

Software houses, with their pool of talent, will be forced to deliver on time, since this would directly impact their bottom lines. They will be forced to devise means of streamlining the development process.

This kind of buyer-supplier relationship is commonplace for engineering products. There is no reason why a similar arrangement cannot exist for software products.

Most important of all, this scenario will lead to an alignment of the goals of the users to those of the suppliers. Management will be able to meet its objective of acquiring a product for a budgeted price.

Competitive bidding for turnkey product delivery will exert downward pressure on costs and will result in a dramatic increase in programmer productivity.

Examine Requirements

For this arrangement to work successfully, management should critically examine all system requirements. Users should do an in-depth analysis of their functional computing needs and should clearly define their objectives and the boundaries of each system.

Software development should be viewed as a partnership effort with sufficient rewards and substantial stakes for all parties involved in the project.

The common perception is that such an arrangement is not possible and that vendors will not front the risk of software development. Nothing could be further from the truth.

Lately, some organizations, weary of the pitfalls of the software development process, have been soliciting firm bids for well-defined tasks. Results show that competitive factors led vendors to deliver the products below management's expected costs.

The conclusion we come to is that the responsibility lies with upper management to initiate the process.

Neerja Sethi is vice-president of Systems International, Inc., a consulting firm in Troy, Mich.

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College Finds Basic Blocks for Growth in System

TEMPE, Ariz. — "It simply wasn't an either-or decision . . . what we needed was a building block that could stand on its own — a system that would meet all our present needs, keep up with our steady growth and still fit neatly into our program five and 10 years from now."

Those were the sentiments of Dr. William E. Lewis when he went shopping for a computer system two years ago. Lewis is the chairman of Arizona State University's (ASU) College of Engineering and Applied Sciences' computer science department.

The college had outgrown its tie-in with the central campus computer system, and it was looking for something that promised a "good fit" and "growing room." High on the list of system requirements was the ability to serve a variety of masters including students, faculty, researchers and staff members whose respective computer expertise ranged from the proficient to the strictly elementary.

ASU Requirements

The college purchased Honeywell, Inc.'s Multics 68/80 computer system which, according to Lewis, has the mix of flexibility, security, operating ease and power to meet all ASU requirements.

With more than 4M bytes of main memory, 800M bytes of disk storage and a data transmission rate of up to 9,600 bit/sec, the Multics systems supports all the users and their research. The system's built-in virtual-memory feature is considered an added bonus by Lewis because it expands the computer's own memory banks by pulling in program instructions a block at a time during complex computer runs.

Currently the Multics system consists of 32 communications lines tied into a single front-end processor. Ten of those lines are available for phone-in remote access; the rest are located in faculty or administrative offices and student terminal centers, Lewis explained.

Multics is being used for several on-going ASU projects involving analytical modeling, language research and software engineering. Other projects in the works include administrative and classroom applications, Lewis said.

The word processing capabilities have already cut down the work load of faculty and secretaries, according to Lewis. Another popular feature is the electronic mail function, which transmits messages automatically from one user to another and eliminates most interoffice and intradepartmental memos.

In their programming classes, students are prompted step-by-step through program entry and editing, Lewis said. An arsenal of on-line "help" information is at the students' fingertips, and Multics debuggers are reportedly fully interactive in all system languages, including Fortran, Cobol, PL/1 and APL.

Lewis claimed that "our faculty is working with resources as good as they'll find anywhere in the industry," which he has felt thankful for at recruiting time.

"Being able to say to potential faculty members, 'We've got a Honeywell Multics' has been a real boon in our recruitment efforts."

Directory Details On-Line Services

DELRAN, N.J. — Datapro Research Corp. has published the *Datapro Directory of On-Line Services,* said to describe more than 100 on-line services and 500 data bases by product, vendor, application and pricing.

Each product is also cross-indexed to all its related listings, and the book reportedly features a general index and indexes of applications, companies and data bases.

The subscription rate is $390 with an introductory rate of $340 for the two loose-leaf volumes, 12 monthly update supplements and newsletters and use of the firm's telephone inquiry service. Datapro is located at 1805 Underwood Blvd., Delran, N.J. 08075.

DBMS Backs Accountants, Analysts

Managers Use Desktop Terminal to Access Data

DANBURY, Conn. — An informational management system accessed through desktop terminals in each manager's office has made gathering current data on-line "a part of the work habit" for the corporate controller and his staff at Union Carbide Corp. here.

Based on Infodata Systems, Inc.'s Inquire data base management system, Union Carbide's Management Inquiry and Display System (Miad) "combines the allure of personal computing with the power of our mainframe data base," assistant controller John McAssey said. "The result is an emancipation of information," he added.

Miad was designed to enable corporate accountants and analysts to retrieve and display the Union Carbide worldwide consolidated financial data. A macro-driven software program has been developed to enable the assistant controller's group to create on-line reports and monitor each company's performance within Union Carbide Corp.

"No longer does a manager have to go to systems technicians for nourishment from the data," McAssey said. "He can sit in the privacy of his office and develop reports that assist him in his work. He can ask a question that is a combination of several issues." McAssey noted that these capabilities are especially interesting to managers in the 45-plus age group who haven't had the benefits of growing up in the computer age.

Before Union Carbide developed Miad, management had two alternatives for gathering information, McAssey explained. The first option was to request a report through several layers of people. The second alternative was for the manager not to ask any questions and just work with limited information. "Unfortunately, no news is not good news," McAssey said. "It hurts when you have to shoot from the hip, and many opportunities can be lost because questions are not answered with current, complete data."

Requirements

Among the requirements for the Miad system was the ability to interface with the company's GL/80 general ledger package from Management Science America, Inc., he explained. Beyond this, it had to be usable by nonprogrammers, interactive and able to handle hierarchies of components/accounts/time periods. Other desired features were statistical routines and "what if" capabilities.

Financial managers were asked to examine several available software packages, and they ran a pilot test using data from the corporate consolidation data base. Then McAssey; Paul McKeever, manager of corporate accounting systems; and director of corporate accounting Jim Fields visited the Union Carbide Information Center in South Charleston, W. Va., to see demonstrations of other possible solutions, including Inquire.

Because Inquire fulfilled the listed Union Carbide requirements for the Miad project, it was selected and a task force of potential management users began work on installing the system.

Fields and McKeever, both members of the task force, worked closely with the firm's Information Systems Development department to design 20 screens for accessing information from five financial data bases in the Miad system. Each menu was test-formatted on a Wang Laboratories, Inc. terminal, printed out for concurrence by the task group and then incorporated into the Inquire Miad system.

In less than four months, the Miad system was complete and running, and the information could be accessed by a number of different terminals currently available to the users.

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Mortgage-Tracking System Cuts Costs, Staff Levels

BOSTON — Cuts in both costs and staff requirements have resulted from a newly implemented mortgage-tracking system at the Mutual Bank for Savings here.

The system, which consists of Inform software from Cortex Corp. of Wellesley, Mass., coupled with a Digital Equipment Corp. (DEC) PDP-11/70 minicomputer, reportedly enables on-line interviews, quick determination of appraisal and credit status and rapid log and report generation. "What used to take weeks to determine now takes minutes to locate and then to generate," according to loan officer Anne F. Craigs.

The Inform Mortgage Tracking System decreases the amount of time the bank needs to qualify applications and make loan commitments, while it lowers the cost of processing mortgage applications with its automated procedures, Craigs claimed. For example, Craigs said the system automatically prepares forms on a daily, monthly or ad hoc basis helping to complete transactions and ease compliance with government requirements.

Move to On-Line

Prior to installing the new system, Mutual Bank had two interfacing departments arranging mortgage loans: the Appraisal-Underwriters group and the secretarial department. Out of the 13-18 employees, three to six appraisers reviewed properties and made recommendations for loans, while five to nine secretaries completed the required typing and paperwork. Delays and losses frequently occurred in this backlog of paperwork, according to Craigs.

The move to an on-line system consolidated these two departments, reduced the number of appraisers, and upgraded the secretarial positions.

Mortgage loans are now handled in a single department consisting of nine workers: two appraisers, four fee appraisers and three interviewers or mortgage representatives, who input application information directly into the system via DEC VT100 terminals.

Significant Labor Savings

Craigs maintained the reorganization has resulted in significant labor savings in the bank's Origination Department and, more importantly, better customer service. "Besides getting all of the management reporting data we want and need by pushing a few buttons," Craigs said, "the system has allowed us to project a much more professional image to the customer."

Furthermore, the Inform Application Development System has not only accelerated applications development time by up to 10%, but performance is reportedly up some 60%.

In conclusion, Craigs cited the bottom line of the system implementation: "The tracking system has allowed us to be more competitive with other financial institutions in our quality of service."

Newsletter Debuts On Computer Crime

ANNANDALE, Va. — Washington Crime News Services and the National Center for Computer Crime Data have joined forces to produce a new monthly newsletter, "Computer Crime Digest."

The periodical will address investigative, accounting and prosecution problems facing law enforcement and security officers, according to the publishers.

Free copies of the prepublication issue of "Computer Crime Digest" are available from Washington Crime News Services, Suite 400, 7620 River Tnpk., Annandale, Va. 22003.

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MVS Dump Debugging.............................$445
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CICS Command Level Programming.......$595
October 19 - November 18.............New Jersey

CICS TRAINING
CICS Command Level Programming.......$595
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Systems-Analysis Workshop....................$695
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USER TRAINING
Introduction to Data Processing.............$175
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Laboratories' Decision to Try Unproven Package Pays Off

CLARKSBURG, Md. — The decision to try a relatively unproven system software product from a new vendor has paid off for Communications Satellite Corp. (Comsat) laboratories here.

Having made the commitment to IBM's VM environment on an IBM 3032 in 1979, Comsat had been using IBM's Dasd Dump/Restore (DDR) program to accomplish disk-to-tape backup of its VM files. Backing up its disk on tape was critical to the supplier of satellite communications services in case a disk failed or a user inadvertently deleted a file, according to Samuel Wax, the manager of systems implementation in Comsat's computer center.

While DDR worked adequately, Comsat said it had disadvantages. For example, the software would dump only entire disk packs to tape, requiring the company to dump its entire system to tape each night. In addition, DDR only permitted the use of one tape drive at a time. Meanwhile, Comsat's VM system held 1100 minidisks, containing 48,000 individual CMS files on-line.

Another problem with DDR was that it could not directly restore an individual file. In the Comsat environment, this restriction was considered a major disadvantage.

Wax said the need to serve Comsat users better provided the impetus to solve its problems. So about a year ago, Comsat decided to become one of the first users of VMBackup from VM Software, Inc. of Falls Church, Va.

"To the best of our knowledge nobody else sold a product to meet our needs," Wax maintained, and added, "We're quite satisfied with it."

VMBackup reportedly uses multiple tape streams that cut down substantially on time required for backup. It also features incremental dump capability, so only user files that have been changed are backed up, rather than taking the time and tape to back up an entire disk pack. This conserves machine time and tape, while simplifying tape-to-disk restore processes if a file is accidentally destroyed, Wax explained.

Comsat system programmer Thomas Kern concurred, citing both time and cost savings: "With IBM's DDR, we were spending 15 hours of elapsed time and using 138 tapes on weekly dumps. With VMBackup, we are spending only 1½ hours a week on full pack backups and using only 9 tapes. We also use a daily incremental backup, requiring less than one reel of tape and about 30 minutes of clock time with VMBackup.

"And we're serving our users better than before — that's the point. VMBackup can do backup and/or restore at any time during the day or night without impacting our users."

DPMA to Conduct Software Seminar

LOS ANGELES — The Data Processing Management Association's (DPMA) Education Foundation will conduct a two-day seminar on software quality assurance, data verification and validation. The seminar is slated to take place in San Antonio, Texas, Nov. 1-2; Boston, Nov. 4-5; and Washington, D.C., Nov. 15-16.

The program will be presented by Raymond Rubey, technical director of Softech, Inc. Rubey will focus on problems facing software managers and will suggest some solutions to effect quality assurance, verfication and validation.

Registration costs $425 for DPMA members and $445 for nonmembers. Group discounts are also available. Further details can be obtained from DPMA Seminars, P.O. Box 91295, Department SQA, Los Angeles, Calif. 90009.

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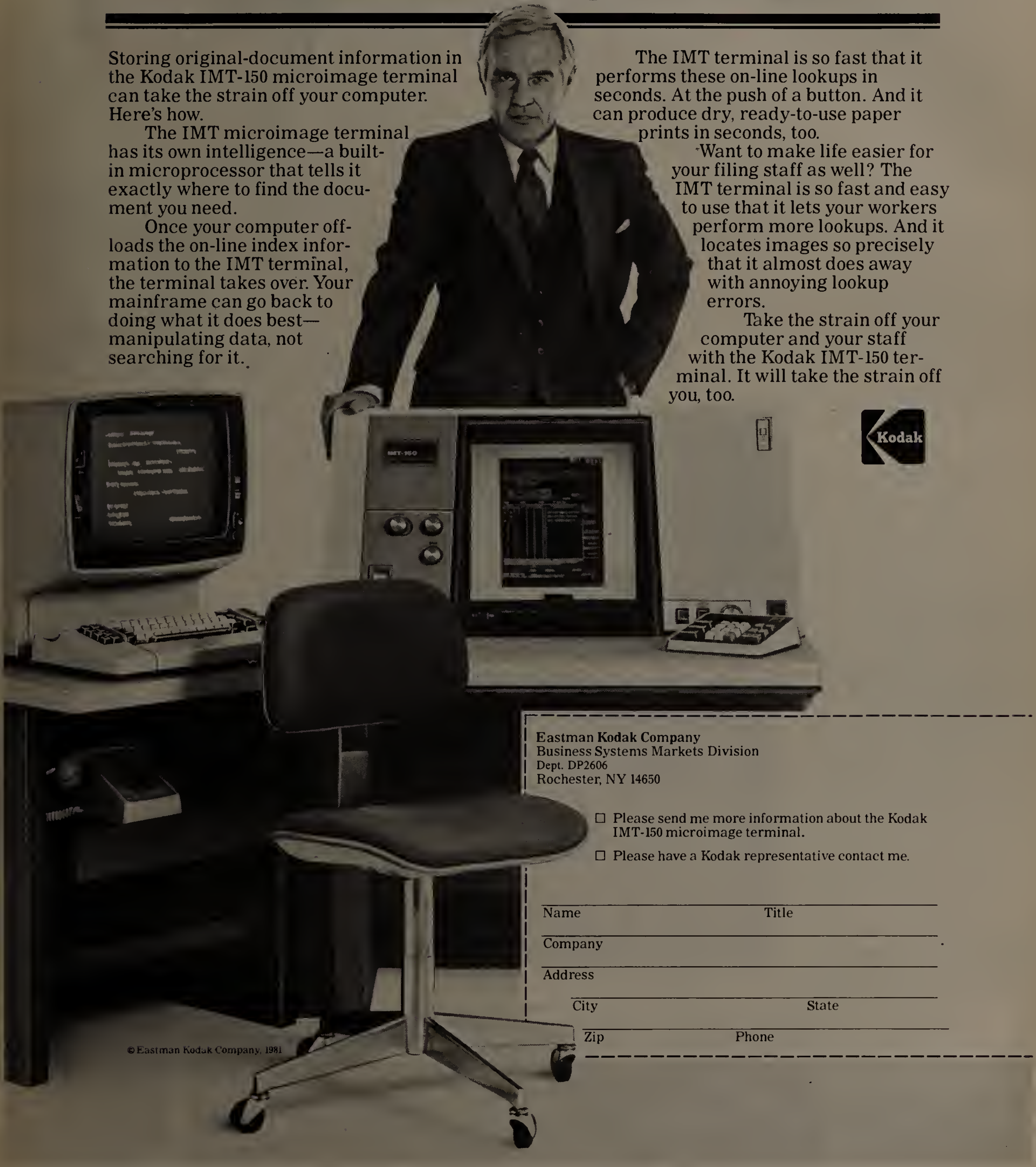

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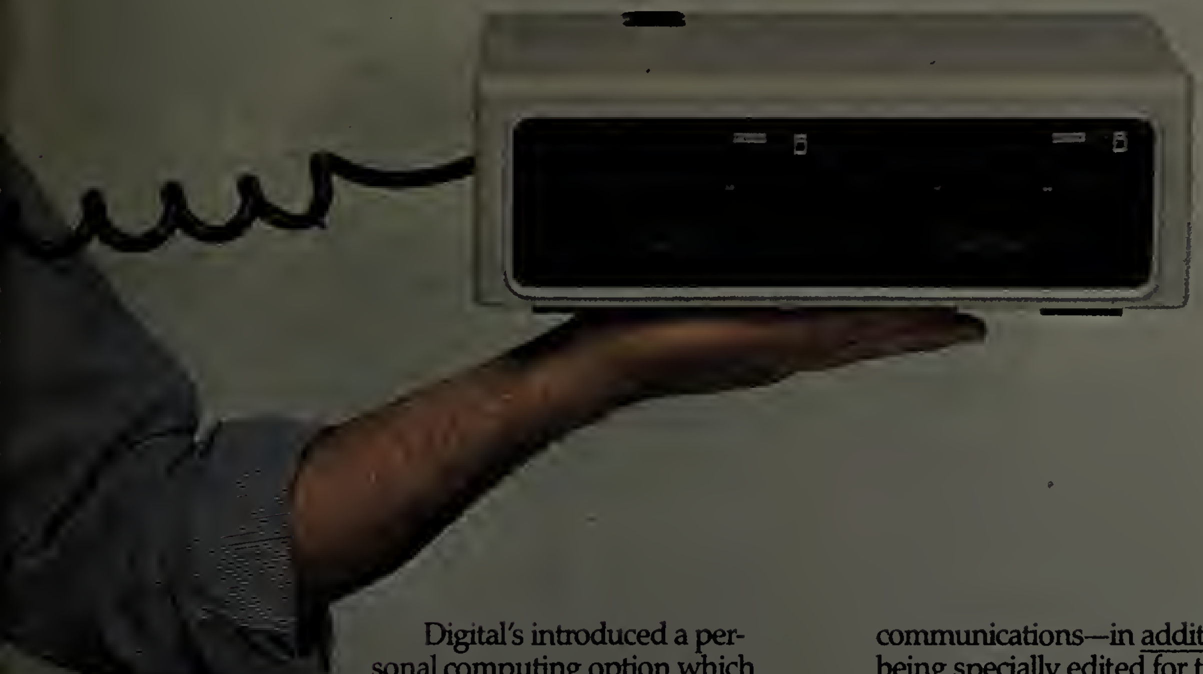

Digital's introduced a personal computing option which can turn a VT100 terminal into a personal computer that uses the CP/M® operating system.

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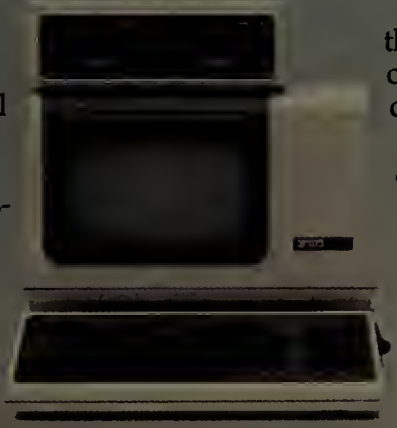

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T/S Helps Multinationals Track Subsidiaries

SEATTLE — Keeping up-to-date records of what foreign subsidiaries are doing can often be a hassle for DPers in multinational corporations and a handicap to executives doing strategic planning. But at least two multinational corporations have found time-sharing to be a solution to those problems.

Schoenfeld Industries, Inc., an apparel manufacturer here, is using time-sharing services provided through Control Data Corp.'s Service Bureau Co.

According to Schoenfeld's assistant controller, Judy Van Noy, the firm has multiple international reporting stations hooked into the time-sharing system that was installed in May 1980.

The foreign subsidiaries prepare financial information on foreign currencies, which is consolidated at corporate headquarters here. The system is programmed to make conversions into U.S. dollars, and the figures are then consolidated for management reports.

"In the past, we would make the conversions over a two-week period. Now we get the conversions in about five minutes and there is almost no chance of error," Van Noy said.

'What-If' Analysis

In addition to making currency conversions, the system is used to perform various types of financial modeling and "what-if" analysis.

That information, as well as data collected from around the world, can be presented to Schoenfeld managers via the system's graphics capabilities, which can produce graphics and print them on transparencies for board meetings, Van Noy said.

The heart of the time-sharing package is CDC's Prophit II data management and reporting language to communicate with the foreign subsidiaries.

Van Noy said Schoenfeld chose that package because it was fairly easy to use and allowed solutions to be implemented quickly.

Another multinational firm, Beatrice Foods Co. in Chicago, is also using CDC's service bureau. The firm has about 100 different international profit centers, which have been operational since 1978.

"Periodically, we evaluate alternatives to the system. We've looked at hardware companies, but time-sharing always wins out as the best method available for what we have to accomplish," according to systems analyst Dennis P. Jones.

Since installing the system, "we've been able to change our focus from merely tracking historical performance.

"One of the principle uses for this system is to aid us in planning and forecasting," Jones said.

Before time-sharing, Beatrice started each June to prepare documents for budget presentations for the rest of the year. "That would compromise the accuracy of the plan because we didn't have all the facts we would have later in the year. Now, we can establish the same plan in August or September. This gives the time to determine what the impact from various factors will be on operations," Jones said.

In addition, the time-sharing system allows the food company to evaluate the performance of its foreign subsidaries.

Things like operating groups, business lines and country-by-country evaluations can be processed, Jones said.

"We do business in 26 different currencies. By putting the system to work, we have a much better way to determine exchange rates. A foreign subsidiary may be showing strong earnings in its own country, but those profits are going to evaporate if the local currency is weak.

"Situations like this naturally have to figure into our overall planning," Jones said.

Like Schoenfeld Industries, Beatrice Foods uses a CDC graphics package to create a monthly financial summary for management. "The graphics have become quite popular since we began using them [in 1979] to highlight trends and compare the financial performances of the different geographic areas," according to John P. Deckro, controller for Beatrice's International Division.

ISI Users Meet Set for Oct. 1

DENVER — Innovative Systems, Inc. (ISI) will conduct its annual Users Conference here Oct. 1.

ISI specializes in software and consulting services for central information-file conversion and maintenance and marketing for financial clients and industrial organizations.

The theme of this year's meeting will be ways to transform a central information file into a more versatile data base for marketing and strategic planning purposes, according to an ISI spokesman.

In addition to the marketing data base discussions, present and future enhancements to all ISI systems will be outlined, and users will have the opportunity to suggest further enhancements.

Additional details on the upcoming event can be obtained from Kenneth Benvenuto at ISI, 341 Fourth Ave., Pittsburgh, Pa. 15222.

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Mini Handles All the 'Trimmings'

Auto Decorator Logs On to Hold Profit Line

HOLT, Mich. — Maintaining profits while staying competitive is a critical objective of many companies in today's economic environment. Fortunately, computers are at the forefront of this battle against the inflationary bulge.

At Spartan Plastics, Inc., for instance, an NCR Corp. minicomputer is used to achieve faster customer service, better inventory control and a more efficient manufacturing operation.

Recently, the computer has been augmented by the addition of a bill-of-material module that provides a central control point for keeping accurate and up-to-date product structure and cost data, making it possible to maintain and retrieve manufacturing and cost information on an entire product line, according to Chuck Krauss, president of the firm based here.

Spartan is reportedly a leader in the production of self-adhesive, decorative trim products for the automotive aftermarket. It also manufactures trim products for boats and product identification labels and fleet markings for industrial applications. The company employs 125 people and has annual sales of $14 million, Krauss said. The company receives about 100 orders per day, each one requesting as few as two or as many as 500 items.

When the firm opened for business 22 years ago, office operations were handled manually. Later, a bookkeeping machine was installed to mechanize the accounting. But order processing continued to be handled manually because the company was small enough that employees knew every customer, order and product.

As business grew, the firm decided to install a minicomputer. It initially installed an NCR 8200 system, but gradually it evolved to a more powerful NCR 8410, which is what it uses today.

The minicomputer presently has 512K bytes of memory, four NCR 6590 disk units for a total storage capacity of 200M bytes, a 300 line/min. printer and seven CRT terminals.

On the 8410, the firm has implemented the bill-of-material module offered with NCR's Interactive Manufacturing Control System II. The module's data base maintains both standard and current costs for material, labor and overhead amounts by item. Data is entered through a CRT terminal.

Because of the module's data base structure, any changes made to an item in the file are reflected throughout the entire product structure master file, updating all bill-of-material costs, Krauss explained. The module's data base also makes it possible to automatically roll current costs to standard costs to establish new standards and allows rapid retrieval of detailed information.

"Previously, we had costing information, but it was produced manually only once a year," Krauss stated. "Now, we enter cost increases as they occur, automatically updating all bills of material whose costs are affected."

To boost inventory control, the firm developed a finished products inventory file that is now part of the bill-of-material module. The products file maintains a perpetual inventory, which is checked daily for accuracy, and frequent sample inventories that are conducted throughout the year.

The module can also produce labor distribution reports for capacity planning purposes, a weekly report comparing standard labor hours to actual labor hours and a material-requirements report for planning component parts and raw materials.

Sales reports are also produced on the system by product, customer and each of the firm's 50 sales representatives. Presently, the system maintains accounts receivable for 4,000 Spartan customers.

"In writing." Deby Fain, National Market Support Manager, Electronic Office Systems Division

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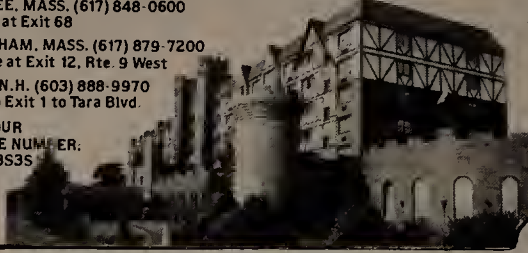
Course Offered For RPG-III

WOODLAND HILLS, Calif. — A computer-assisted course for IBM System/38 RPG-III programmers is available from Automated Training Systems.

The course reportedly allows programmers familiar with RPG-II to take full advantage of the new features available with RPG-III. It covers the RPG-III life cycle, externally described data base files, file operations, structured programming op-codes and constructs, debugging facilities and several additional op-codes. It also covers the mechanics of creating programs and files for the System/38.

Included are 10 audio-cassette tapes, three illustrated study guides and workbooks, a diskette with several source programs and the test files that are needed to execute them and which can be accessed and modified by the student.

The course costs $695 from Automated Training Systems at 21250 Califa St., Woodland Hills, Calif. 91367.



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Perfume Firm Sniffs Success With Expansion of System

PARIS — The sweet smell of success has always belonged to the exclusive Guerlain label of perfume, and computer technology is ensuring that optimum manufacturing and administrative methods keep it that way.

Over the last 10 years, sales at Guerlain have soared at the rate of about 15% per annum.

The firm recently updated its computer system to a Sperry Univac System 80 to expand its real-time facilities in light of the company's continued expansion.

The firm produces 12 major perfumes, each with its own packaging and marketing style, and a full range of makeup and skin care products. A remarkable aspect of the perfume is that each scent can contain as many as 100 different ingredients.

Computer monitoring of how much of each ingredient is needed at any given time is absolutely necessary for the business to run smoothly.

The firm also employs 30 people to develop and test new materials and help synthesize new ingredients. The actual creation process is one of meticulous detail, and one new perfume can take as long as five years to develop.

Once a perfume, toilet water or cologne is made and packaged, it must go quickly to distributors and retailers. This is most important for cosmetics, and particularly skin care products, which need to be especially fresh to be most effective.

Every three weeks a different line of makeup is produced at the Chartres factory, and different perfumes are produced every two months at the Courbevoie factory. Because of systematic production control, ordering and dispatch procedures, Guerlain manages to get goods to their stock lists that are never more than two months old.

Routine Functions

As well as ensuring that manufacturing processes go smoothly, the computer takes care of all the routine administration and financial control functions relevant to any home and export company.

The four major areas of activity are: order/distribution management, for customer and suppliers; accounting, for production and general uses; personnel administration, including payroll; and manufacturing.

Guerlain's configuration includes one System 80 Model 5 with 768M bytes of main memory; 118M bytes of disk storage; one floppy disk unit; two magnetic tape units; two 640-line/min printers; six workstations; and five UTS 20 CRT terminals, plus copy printers.

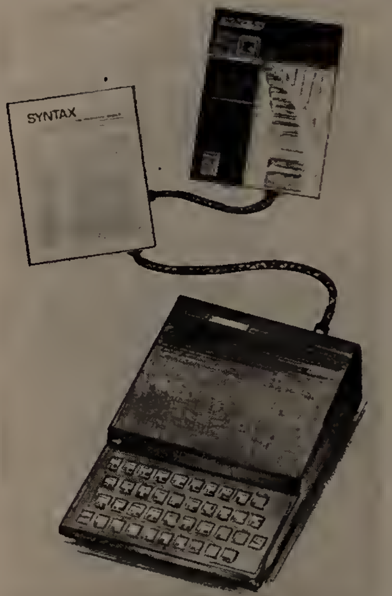
The first step in getting the System 80 operational was the changeover of existing batch jobs to real-time systems. Soon the firm plans to automate the dispatch function.

In the future, Guerlain may also utilize Univac's Unis 80 software, comprising interactive modules that share data through a common data base.

Unis 80 modules include production, engineering, data management, product costing, customer order processing and purchase order control.

Other modules include inventory status and control, forecasting and analysis, master scheduling, material requirements planning, production planning and work order control.

'Dough Re Me Fa Sold La Tee Hee!'



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Outside Contractors Offer More Than Experience

By Paul A. Martino
Special to CW‡

DP managers who during "peak-load" situations find themselves temporarily short of specific talent are adept at acquiring it on a temporary basis by contracting with an outside service.

Occasionally, though, the reasons for turning to an outside contractor are broader than the acquisition of specific skills. The DP manager may wish to supplement the experience of his staff with a temporary outside resource while a more permanent solution is pursued.

Experience is more difficult to acquire and use effectively than programming and analysis skills, and maximizing the benefit for the dollar spent in the purchase of experience can be considerably more elusive.

Collection of Skills

Experience might be best thought of as a collection of skills in a wide variety of areas. These might range from such things as techniques not covered by the Cobol manual to the ability to write memos, conduct meetings and interview users. From this point of view, experience can be valuable in several ways.

The first is feedback, although it is also the most difficult to take advantage of. There is a normal procedure whereby the policies and activities of a department are continually reviewed and fine-tuned. The results of various activities and performance are weighed by management and required enhancements or modifications are made. An experienced external prospective could be of use in making these observations.

The outside observer's determination of where a change of emphasis is needed or where a modification of procedures is required or where a specific skill is called for can be of particular benefit. An appropriate feedback mechanism that places these views before management can produce positive results. This approach has an inherent danger: Staff may see it as a threat intended to criticize them. Management must be especially sensitive to this possibility and monitor these activities with care.

Formal training is a direct way to take advantage of experience. The experienced person can conduct a formal class in the skills which will benefit the department. This type of training lends itself to the full range of technical topics and to project methodologies.

Formal Training

The DP manager should also consider formal training in such things as oral and written communications, the art of conducting meetings and other people-related skills. There are, however, limits to how much formal training an organization can absorb or endure.

One of the more valuable ways experience can assist an organization is through day-to-day training or coaching. This technique can impart knowledge of many different skills in a very effective manner. It has the advantage of transferring knowledge at the most appropriate time — when it is needed. Properly approached, coaching can produce significant results with a minimal disruption and is equally applicable to both technical and nontechnical skills.

Two important prerequisites must be established if any of these areas are to be successful. The first is an explicit definition of what goals are to be attained. Success models for performing this type of activity are uncommon when compared to familiar areas like programming or analysis. It is subsequently all the more important that a clear statement of what is expected and what can be accomplished is produced. If care is not taken to explicitly state specific goals, the danger of disappointment on the part of management and frustration on the part of contracting personnel is very great.

The second prerequisite is legitimacy. All of the activities noted above usually proceed from a higher point in the organization to a lower one. Thus the most junior members of an organization are the recipients of training, not the originators of it. This level of employee generally looks to management for guidance on appropriate training.

It is important that any activity in these areas be viewed by the rest of the organization as having the blessing and approval of management. This does not mean that a contractor must be put in a position of high authority, or that new positions must be created, or that organizational charts must be changed. It does mean that the organization must be aware of management's goals and the course management has set for their attainment.

The strategy discussed here has the objective of acquiring and retaining knowledge in the host department. The most benefit will be attained when as much knowledge as possible is transferred from the contracting personnel to department staff. This will lead to a continuing benefit from the dollar spent on the particular assignment.

Martino is vice-president of Kieffer, Martino and Associates, Inc., Cheektowaga, N.Y.

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College's Engineers Line Up To Get Graphics Capability

Purdue's Prof. Peter Hallenbeck translates calculations into graphics form.

WEST LAFAYETTE, Ind. — Professors of Purdue University's 12 schools of engineering were lining up for the chance to get their calculations into graphics form. The line formed at the hard-copy printer.

Although Purdue had the computing power of six Digital Equipment Corp. VAX-11 computers and two PDP-11/70's running Bell Laboratories, Inc.'s Unix operating system, users who wanted graphics displays of their data still had to leave their offices and find an unused hard-copy device.

Many of the professors would have preferred to have graphics displayed on their own dumb terminals, and more and more of them have found research funds to upgrade the terminals with a graphics enhancement card.

About a year ago, Purdue began upgrading its Lear Siegler, Inc. ADM-3A terminals with Digital Engineering, Inc. Model RG512 Retro-Graphics terminal enhancements, a company spokesman said. The school began with three boards and has been adding boards regularly ever since. Purdue now has 10, with more to come.

Move Popular With Faculty

The move has been very popular with the faculty, according to the school of electrical engineering's hardware designer Peter Hallenbeck. "Rather than leave their office, find a printer, wait for hard-copy generation and go back to the office to study the result, they simply put the picture on the screen in front of them," Hallenbeck said.

The users do not need to learn graphics programming. Purdue has designed its own "Quickplot" program that turns data values into positions on a bit map of the screen. The user runs an application program on data files; the application program produces files of vectors and Quickplot puts the results on the screen.

"It's not as complicated as it may sound," Hallenbeck said, because the Unix operating sytem has 'shell' files, or macros, that call several files in sequence. A simple command to the system will compile the program, run it with the data specified, bring up the Quickplot and display results.

The user can take any degree of control over what the graph looks like. "Most graphics packages have enough options to drive us mad," Hallenbeck said.

The normal process is to go with the default values for rough drafts, then dress up the final results with labels, log axes and data point values for final presentation, a Digital Engineering spokesman said.

The Digital Engineering boards are compatible with a Tektronix Inc. 4010 graphics terminal, so the faculty can use Purdue's high-resolution graphics terminals and printers for final display, the spokesman said.

Hallenbeck, who is part of the team that maintains computer equipment at Purdue, was familiar with enhancement boards and had designed a similar board for one Purdue terminal. "We didn't think it would be too much trouble to design a box that would sit on your terminal and watch the characters go by, and when it saw a 4010 graphics word, would interpret it and start plotting," Hallenbeck said.

"Our problem was that every time we found a terminal clever enough to upgrade to graphics, the terminal alone costs $2,000 to $4,000. We would have had to pay for a lot of modularity, a fully configured terminal with a backplane and interface logic cards. All we wanted was graphics."

Purdue considered designing its own terminal, but eventually came back to the ADM-3A because of its low price.

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Faster Turnaround Time

Tax Service Bureau Gets Returns With System

LOS ANGELES — Signifying the end of the tax season, a big party was held for 32 permanent and 238 temporary employees of Computer Sciences Corp.'s (CSC) Tacs office, a data processing service here that specializes in fast turnaround of income tax returns for accountants and tax preparers in 12 western states.

Not surprisingly, it was the night of April 15, 1982 — and there was plenty to celebrate. Since Jan. 4, when the first batch of 250 tax returns was fed through a Magnuson Computer Systems, Inc. M80 mainframe and then printed out on three Xerox Corp. 9700 electronic printing systems, Tacs had finished a record 600,000 returns. The service had turned each return around from input data to delivery within an average 48-hour period. A single-day high of almost 12,000 returns was reached on April 9, a company spokesman said.

The computerized tax preparation industry, which nationwide accounts for a mere seven million of the 100 million income tax returns filed annually, flourishes in California. But for some unknown reason, Tacs DP Manager Robert L. Slattery reported, "accounts in other parts of the country don't use computers nearly as much."

Tacs has grown at a 30% to 40% annual rate since its launching in 1968, a spokesman said. CSC acquired Tacs in December 1979 from Intel Corp.

Adding Features

Slattery, who joined the firm in 1974, has helped it mushroom in eight years from an output of 150,000 returns to this year's record total approaching 600,000. "Our revenue has grown in part because we're producing more complex returns today. We keep adding new features every year — more computerized input forms as well as schedules that diagnose various combinations of tax law regulations," he said."

Another key to Tac's growth was the advent of Xerox laser-based electronic printing systems, which print both forms and variable data automatically and simultaneously at up to 120 page/min on standard 8½-in. by 11-in. paper, according to Slattery.

"We were handling things in a very archaic manner before the Xerox 9700 trying to put together our hundreds of forms," Slattery noted. "The 9700 is one of the most technologically fantastic machines around, especially for our industry." During tax season, Tacs turns out about 1.5 million pages per month on each of its three 9700 systems, he said.

The typical federal income tax return requires 35 to 40 different forms — not to mention the numerous state forms. Tacs spent $250,000 per year for continuous forms in the years before it acquired its first 9700 for the 1979 tax season. "We no longer have the expense of continuous forms," Slattery added, "and we save a substantial amount on labor costs during tax season."

Tax season for Tacs begins around Labor Day when the Internal Revenue Service releases its preliminary form changes for the upcoming tax year. Of the 500 or so different forms programmed by Slattery and his staff of five programmers (totaling some 600,000 lines of software code) between 350 and 400 forms are changed significantly every year because of tax law revisions.

This programming effort continues until December when the firm sends its 3,500 active accounts input data sheets for every return processed the previous tax season. Coded and preprinted with the client's name and address, these blank data sheets, filled in by the tax preparer, begin arriving in modest numbers around the first of the year at Tacs' headquarters.

Two-Day Turnaround

And thus starts the 48-hour turnaround cycle in the life of a computerized tax return. Logged and batched into stacks of approximately 800 returns, the data sheets are reviewed by checkers for entry errors or missing data. Next stop is data entry, a large room manned by 64 key station operators hired as temporary employees during tax season to work two shifts per day, six and a half days per week until the final push in April, a spokesman said.

A packet of 15 returns takes about 25 to 30 minutes to key and verify. The operators key only the coded number on the preprinted data sheet, instead of the client's name and address, and the Magnuson M80 later addresses the code and automatically recalls the previous year's personal and tax data, including income averaging and other necessary computations.

After the data is keyed in and transferred to magnetic tape, the tapes are entered into the M80 with its 2M bytes of core memory, 800M bytes of on-line disk storage and 11 tape drives. The computer recalls and sequences the data and before any furthe calculations, does a tax-law-oriented edit that generates diagnostic messages identifying illogical, inconsistent or erroneous entries.

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Benefits of Using Consultants Can Be Increased

By Steven J. Blackmore
Special to CW‡

Companies using data base/data communications software packages have, over the years, used a wide variety of techniques to select their consultants. The benefits these companies derived from using consultants have been largely determined by the comprehensiveness of the selection process.

The following guidelines can be used by companies selecting their first consultant, by those that have experienced difficulties in the past or by those looking to improve their current selection process:

• *Know what you want*. The most critical part of the consultant selection process does not involve the consulting firm. It involves you. You must define in advance what it is you want the consultant to do, what type of skills and experiences the consultant should have and when and for how long you will need the services.

The more detail you have available, the easier it will be for the consulting firm to match their personnel to your job requirements. It will also be easier to evaluate performance during the duration of the contract.

• *Go to a number of consulting firms.* Unless you have unique requirements that only one firm can provide, you should submit a request for personnel to a number of different vendors (usually three to five). You should define the type of work, the estimated duration of the assignment, the skills required and when you need to have their personnel available.

The information should be provided to the consulting firms in writing or during a personal meeting with a marketing representative. Avoid the telephone as much as possible, because there is a much greater chance of misunderstanding.

From the consulting firm's perspective, the more information you provide, the better the response they will be able to provide. It is important that you give sufficient lead time so that the consulting firms can schedule the availability of the appropriate personnel.

The selection of a list of vendors can be difficult, especially if you have not used outside services in the past. One successful method is to contact other companies and ask whom they have used.

References play a very important role in the consulting business. Always check the references provided. They will give you a clear picture of the consulting firm's capabilities.

Another Method

Another method is to build a file that is organized by types of services provided. If you need specialized skills such as IMS, CICS, integrated data management systems and so on, go to firms that specialize in providing the types of services you need. These firms have people who are experts.

If there is a need for more general services, go to firms that provide a broader range of services. In either case, by using this approach you will get a better match between your requirements and the consulting personnel.

• *Request resumes.* Always request that the selected consulting firms provide resumes of the personnel being proposed. These should not be representative people who *could* be available, but actual resumes of people who *would* be available to perform the assignments. You must make certain that the individuals have the required skills and experiences.

• *Interview the potential consultants.* A company should never bring consultants into the firm without a technical interview to ensure that the individual meets the standards required to perform the assignment.

Do not be afraid to be tough; most consultants expect a difficult interview. The individual should be considered as if he or she is going to be a permanent employee.

• *Select the consultants.* Select the individuals who best meet job specifications. A company that is hiring consultants should always look first at the individuals being selected — after all, they are the ones that are actually going to do the work, not the sales or marketing representative of the consulting firm.

The company should then look at the reputation and past performance of the consulting firm to ensure that the firm will be able to provide the necessary level of service over the duration of the contract.

In addition, it should be considered whether the consulting personnel are full-time employees or subcontractors. The consulting firm can maintain more effective quality control over full-time employees.

• *Evaluate the performance of the consultant.* There should be an on-going evaluation of how well the consultant is doing the assigned tasks. If for any reason the performance is not as expected, do not hesitate to ask for a replacement.

A consulting firm bases a large portion of its business upon its reputation to provide quality personnel. It does not want to place people who cannot perform at very high standards of performance.

Blackmore is senior project manager at Data Base Management, Inc. (DBMI), Vernon, Conn.

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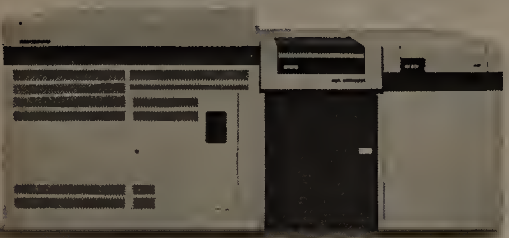
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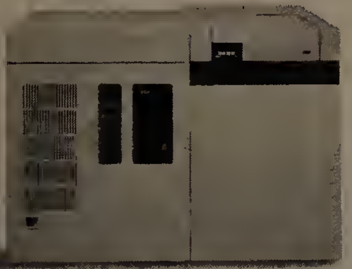
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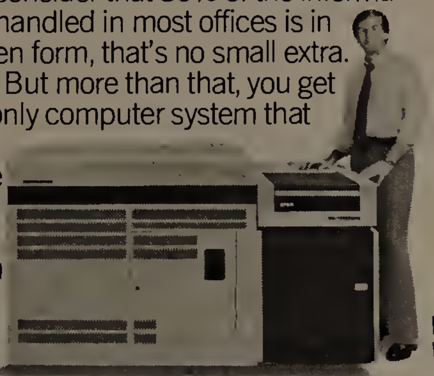
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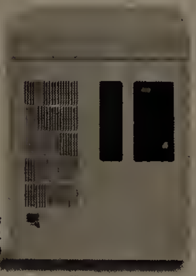
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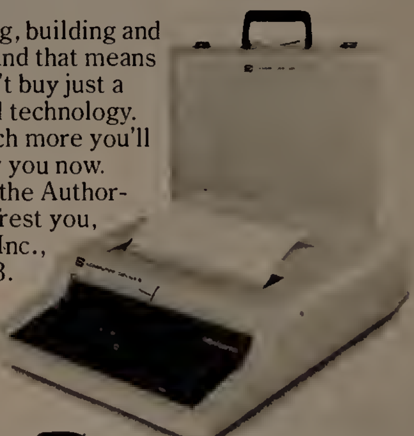

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Management System Helps Manufacturer With Job Control

HOUSTON — Planning ahead is a way of life at the Cameron Iron Works here, a leading equipment manufacturer for the oil, gas and airline industries.

That's why the company, whose DP department runs three shifts, seven days a week, went after the problem of job control before it got out of hand. Five years ago, reruns were not quite a problem, but when one did occur, the operator would have to call a programmer to obtain the restart procedures — often in the middle of the night.

As the data center continued to grow, there was an even greater need to bring reruns under control. The shop presently employs more than 80 programmers and runs an IBM 3033 and a 4341 under MVS/JES2.

Looking for a software package that would handle reruns automatically, Cameron discovered University Computing Co.'s (UCC) Eleven rerun management system. "Nothing else on the market handled generation data groups [GDG], and 95% of our tape files are GDGs," explained Carol Thomas, systems programmer.

A Natural Decision

"Eleven was a natural decision, since it does such a good job of handling GDGs and interfacing with UCC's tape management system [UCC One], which we also have," she explained.

After the system was implemented, Cameron data center employees noticed differences almost immediately. For one thing, programmers are now getting a good night's sleep. Because Eleven automatically sets up jobs for restart, operations analysts and operators are able to handle many more jobs than they used to, and the programmers generally don't have to get involved.

"For the applications under the system, they can use the on-line list-step feature," Thomas said. "Then they determine if the job is restartable."

Operations analysts also use the list step to learn which steps aren't restartable when they first bring a new job under the system's control. They can find out where they have to modify the JCL to bring it in line with the center's goal of making all steps in the job restartable.

"Eleven's on-line portion has also reduced the amount of information operators have to log manually to document an abended job," Thomas noted. "Rather than relying on a combination of written logs and JCL listings, the operators can find out about job restarts including 'reason for rerun' by simply calling up that data on the CRT screen."

System a Big Help

Thomas noted that the system has been "a big help" when jobs abend. In preparing for the rerun, the operators might discover that they have three additional tapes input to this job. With one parameter, Eleven will allow them to run the JCL without having to uncatalogue and recatalogue the data sets or modify the production JCL.

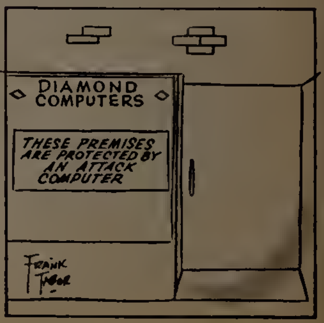
What about future plans for Eleven? "In a disaster-recovery situation, we must have Eleven available," Thomas said. "Because we'll have the production jobs on the system's history file, we won't have to look for the JCL from the previous night to find out whether it ran or not.

"All we'll have to do is inquire through Eleven," she added. "It will be a critical part of our disaster-recovery plans."

Another plan for the system is the addition of an exit to allow the tracking of CICS regions. "A lot of manual work is now being done by secretaries looking at the JCL, looking at output from various jobs and drawing up charts on how long CICS was up each day during the month and the percentage of time it was up," Thomas explained.

By putting CICS under the control of Eleven for tracking purposes, data center employees can pull that information on-line or through batch reporting. "I think it will be more accurate and much easier to compose statistics for our data center director, because he does keep track of our up time," Thomas added.

Thomas also plans to have a procedure that will allow programmers using the system for their test jobs to take advantage of the rerun handling features of Eleven.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Supply Firm Runs Growth With Software Transfer

SANTA CLARA, Calif. — The ability to transfer its in-house developed applications software easily to new processors has allowed Inmac Corp. here to grow from a two-person operation to a multimillion dollar concern during the past six years.

Software transportability across hardware generations has been the key to the computer supplies and accessories company's entire software development and maintenance strategy.

"We are currently using two — soon to be three — different processor models," according to a company spokesman. "If we had to develop and maintain separate versions of our systems, we'd need a much larger programming staff and possibly larger development systems." In addition, the firm would have to do more and longer range advance planning for DP.

Currently, the firm develops its own software centrally for a single version of each package. The company sends out identical copies of software to each branch, and when there is a problem, the corporate DP staff works out the bugs at the central office using a master copy of the package.

Once running two branch locations, Inmac's DP operation has expanded to seven Data General Corp. Nova minicomputers lined to more than 50 interactive terminals. This hardware supports order entry, inventory control, general ledger and accounts receivable/payable for 40,000 mail and phone order customers in the U.S. and the UK.

Eclipse S/140 Added

The company reported it has been able to upgrade from a Nova 3 to a Nova 4 system and now the firm is adding an Eclipse S/140. "We put comparatively small machines into what turned out to be our two biggest branches and the Nova 4 systems into our newest ones," the spokesman explained. But because the software was completely compatible among the different processors, the location of the processors was not an issue.

Inmac's processing activity runs from order entry to inventory to bookkeeping. The firm's catalog lists more than 2,000 products for the computer industry ranging from printout shredders to disk packs. About one third of the products are manufactured by the company.

The spokesman acknowledged that DP power has a significant impact on Inmac's operation. Besides processing the 6,000 transactions going through each branch every month, the spokesman said that automation allows a more knowledgeable response to customers. Once an order goes into the machine, it is immediately checked against the most recent inventory status report to check which items are out of stock.

Overall, DP has been inexpensive. "I'd estimate that Inmac's total DP bill has been between three-quarters of 1% and 1% of gross sales. For a company as involved in pushing data around as we are, I'd say that's quite good," the spokesman concluded.

Self-Study Course Trains ISPF Users

LOS ANGELES — Crwth Computer Coursewares has a new self-study interactive course, "ISPF (SPF) for End Users."

The course was designed to instruct users of an information center with the use and facilities of the IBM's ISPF to create and maintain their own data files.

The course can be leased for $1,500 per year or $3,750 for a perpetual license. Crwth is located at Suite 205, 12655 Washington, Blvd., Los Angeles, Calif. 90066.

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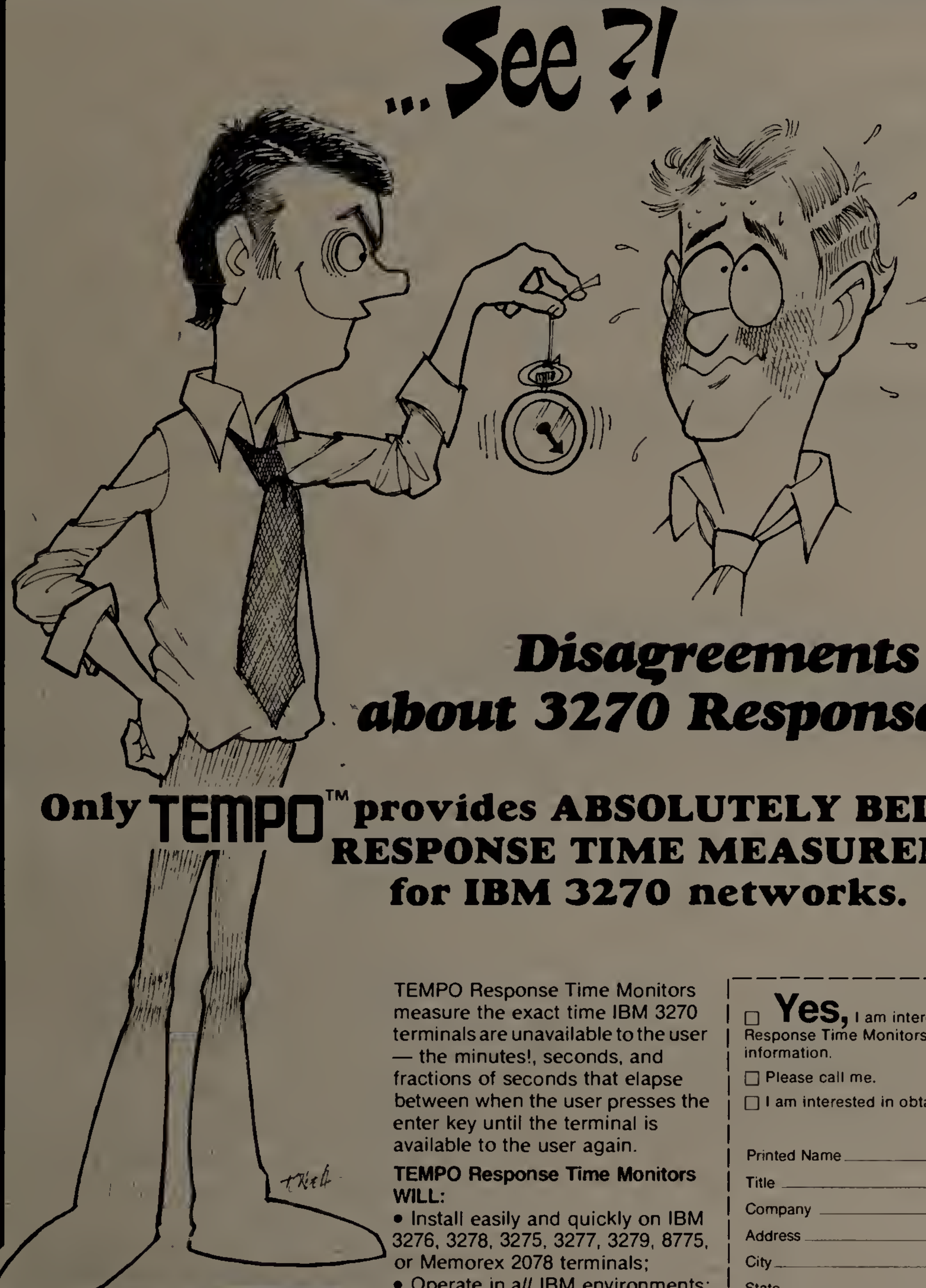

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Graphics Obtained Four Times Faster

Data Center Finds COM Recorder Saves Time

WILMINGTON, Del. — After the Information Systems Department (ISD) of E.I. Du Pont de Nemours and Co. replaced one computer output microfilm (COM) recorder with a newer model, it received graphics imaging services four times faster than before.

According to John Mattey, supervisor of support services in the corporate data center, which handles data processing for the corporation, the center previously offered a COM alternative in 1970 by using an outside service bureau.

In 1973, ISD installed its own COM facility. Since then, the facility has grown from a one- to a three-shift operation with a sevenfold work load increase requiring nine operators and three limited-service weekend operators. ISD now provides COM and printout services for Du Pont throughout the U.S.

ISD recently installed a 3M Corp. 735 COM recorder, supplementing a 3M 710 unit that was already in place. The new unit provides flexible graphics imaging services at four times the speed of previous COM devices, Mattey said. During an average month, ISD produces three million pages of COM output and 16 million duplicate frames. About 95% of the output is in microfiche form.

"Our new COM unit is faster, as large, more economical and it produces a sharper image than the equipment previously available," Mattey said. Operating at over 22,000 line/min, the two 3M recorders handle throughput more quickly than the high-speed laser printers, he claimed.

The COM facility presently produces 16mm roll film used in either cartridge or reel form, 35mm roll film and microfiche at reduction ratios of 24X (63 full-size pages per fiche), 42X (208 full-size pages per fiche) and 48X (270 full-size pages per fiche). Among fiche options offered are title extractions, indexing, edit breaks and form overlays. The latter are produced by either flashing a form drawn on glass plate or from graphics created with COM software.

Management supports and encourages the use of COM, and since ISD charges for its services, department managers are finding that it is less expensive and easier to use than printout.

Although much COM output is straightforward, Mattey noted a growing demand for business graphics and specialized forms work. One of the criteria in selecting the 3M 735 COM unit was its ability to perform business graphics and specialized forms work with high resolution and data compaction capabilities, he added.

With 3M COM/Quest software, the data center has designed flexibility, Mattey said. Title and edit breaks are built into the software and expanded alphanumerics enables the data center to format output for fast and easy-to-access retrieval.

For example, Du Pont produces rate route sheets on microfiche. The COM generated shipping rate data is copied and distributed to railroad and trucking terminals. "We use microfiche to compact the information for easy distribution, storage and accessibility and graphics design of the microfiche to speed up the retrieval of data," Mattey said.

Cost-Effective

The use of COM is cost-effective for Du Pont, Mattey noted, but precise savings are sometimes difficult to estimate. He cited the example of savings: The data center charges 28 cents for duplicate fiche which, at a 48X reduction, contain 270 images. In comparison, it charges three cents per page of printout, or $8.10 for the number of pages that can be contained on one fiche.

Distribution costs are also much lower, since a microfiche can be mailed for the cost of a first-class stamp. "Compare that to the cost of distributing up to 270 pages of printout containing the same information," he said.

"Thirty microfiche can contain as much data as an entire mile of computer printout," Mattey said. "It reduces paper and handling costs in data processing, since COM eliminates decollating, bursting, binding and heavy paper carton lifting."

Honolulu to Host Fifth PTC Meet

HONOLULU — The fifth annual conference of the Pacific Telecommunications Council (PTC) will be held here Jan. 16-19, 1983, at the Sheraton-Wakiki.

This year's theme will be "Telecommunications for Pacific Development." The registration fee is $235 prior to Sept. 15 or $310 afterwards.

Further information may be obtained from PTC at Suite 303, 1110 University Ave., Honolulu, Hawaii 96826.

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The annual examination for the Certificate in Computer Programming (CCP) will be held on December 11, 1982, at selected test centers throughout the world.

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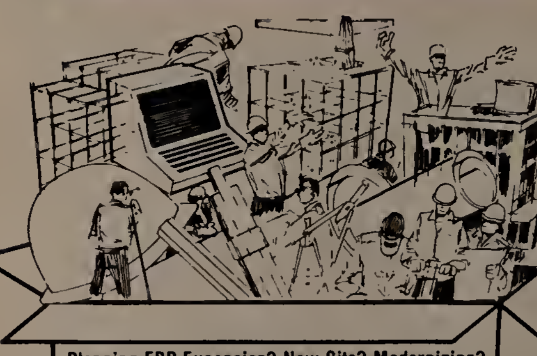

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Oct. 2-3, New York — **CICS Command Level Intensive.** Contact: Sys-Ed, One Park Ave., New York, N.Y. 10016.

Oct. 4-6, Topeka, Kan. — **Feedback '82.** Contact: Ken Orr & Associates, Inc., 715 8th, Topeka, Kan. 66607.

Oct. 4-6, New York — **IMS Data Base Access DL/1.** Contact: Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

Oct. 4-6, New York — **MVS Dump Debugging.** Contact: Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

Oct. 4-8, Boston — **C Language Programming.** Contact: Computer Technology Group, Telemedia, Inc., 310 S. Michigan Ave., Chicago, Ill. 60604.

Oct. 4-8, Munich — **IMS Systems Management Workshop.** Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Oct. 5-7, Phoenix — **Southwest Semiconductor Exposition.** Contact: Cartlidge & Associates, Inc., Suite 1014, 491 Marcara Ave., Sunnyvale, Calif. 94086.

Oct. 5-8, Providence, R.I. — **Quality Circles Facilitator Training.** Contact: The Center for Management Development, Bryant College, Smithfield, R.I. 02917.

Oct. 6-8, Boston — **Basic: An Introduction to Computer Programming for Managers.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 6-8, Los Angeles — **Automated Office VI.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

Oct. 6-8, Danvers, Mass. — **Automated Office of Tomorrow.** Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Oct. 6-8, White Plains, N.Y. — **An In-Depth Comparison of the Leading CAD/CAM Systems.** Contact: Orr Associates, Inc., 21 Chambers Road, Danbury, Conn. 06810.

Oct. 6-8, Chicago — **Financial Information Systems.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

Oct. 6-8, New York — **Magnetic Media, "Tape/Disk Talk" Workshop.** Contact: Stored Information Systems, 102 Cresci Blvd., Hazlet, N.J. 07730.

Oct. 7, Chicago — **Selection & Procurement of Small Business Computers.** Contact: Eduteach, Inc., Suite 907, 162 N. State St., Chicago, Ill. 60601.

Oct. 7-8, New York — **IMS Data Communications.** Contact: Chubb Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

Oct. 7-8, Atlantic City, N.J. — **UFO National Users Group Meeting.** Contact: Product Manager, Oxford Software Corp., 174 Blvd., Hasbrouck Heights, N.J. 07640.

Oct. 7-8, Minneapolis — **Seminars for the Systems Analyst.** Contact: Executive Development Center, 324 Management and Economics, 271-19th Ave. S., University of Minnesota, Minneapolis, Minn. 55455.

Oct. 7-8, St. Louis — **ACM Conference on Security.** Contact: Association for Computing Machinery, 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 7-8, Washington, D.C. — **Auditing Cobol Application Programs.** Contact: MIS

(Continued on Page 58)

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Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

Oct. 7-8, Geneva — **Management Systems of International Risks.** Contact: Insig, Institut de Recherche Interbancaire, Association Sans But Lucratif Regie par la Loi de Juillet 1901, 40 Rue de Monceau, 75008 Paris, France.

Oct. 7-8, Washington, D.C. — **Data Communications: Advanced Concepts and Network Management.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 7-8, New Orleans — **Operational Audit of the DP Function.** Contact: University Seminars, Suite 2846, 420 Lexington Ave., New York, N.Y. 10017.

Oct. 7-8, Chicago — **Data Administration: Development and Practice.** Contact: Arnold Barnett, Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Oct. 7-8, Boston — **Software Engineering.** Contact: Battelle Seminars and Studies Program, 4000 N.E. 41st St., P.O. Box C-5395, Seattle, Wash. 98105.

Oct. 7-14, New York — **Introduction to Assertiveness Training.** Contact: Women in Data Processing, Inc., Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

Oct. 9-10, New York — **CICS Command Level Intensive.** Contact: Sys-Ed, One Park Ave., New York, N.Y. 10016.

Oct. 10-14, Atlanta — **Information Technology '82.** Contact: Association of Records Managers and Administrators, Inc., Suite 215, 4200 Somerset Drive, Prairie Village, Kan. 66208.

Oct. 11, Nairobi, Kenya — **Plenicom '82 International Telecommunications Exposition.** Contact: Horizon House Expositions, Inc., 610 Washington St., Dedham, Mass. 02026.

Oct. 11, Tampa, Fla. — **Computer Graphics in Architecture & Engineering.** Contact: George Borkovich, Editor, 3400 Edge Lane, Thorndale, Pa. 19372.

Oct. 11-13, Los Angeles — **IMS/VS Dump Reading.** Contact: Data Base Management, Inc., 281 Hartford Tnpk., Vernon, Conn. 06066.

Oct. 11-13, Minneapolis — **The Seventh Conference on Local Computer Networks.** Contact: Rick Tett, Software Support International, Inc., 4425 N. Victoria St., Shoreview, Minn. 55112.

Oct. 11-13, Denver — **The 1982 Fall Conference for the Society for Computer Applications in Engineering, Planning and Architecture.** Contact: Patricia C. Johnson, Executive Director, Cepa, Inc., 358 Hungerford Drive, Rockville, Md. 20850.

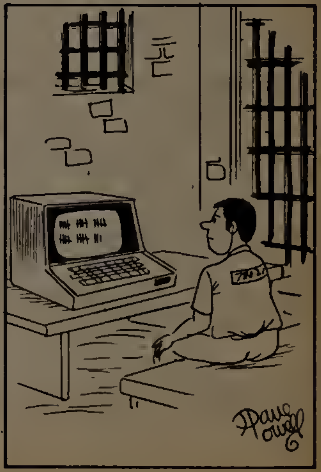
Oct. 11-15, Englewood Cliffs, N.J. — **Software Physics & Systems Management.** Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Oct. 11-15, Los Angeles — **C Language Programming.** Contact: Computer Technology Group, Telemedia, Inc., 310 S. Michigan Ave., Chicago, Ill. 60604.

Oct. 11-15, Los Angeles — **Software Maintenance: Tools, Techniques and Management Strategies.** Contact: University of California, 6266 Boelter Hall, UCLA Extension, Los Angeles, Calif. 90024.

Oct. 12-14, London — **Viewdata '82.** Contact: On-Line Conferences Limited, Argyle House, Northwood Hills, Middlesex, HA6 1TS, UK.

Oct. 12-14, Arlington, Texas — **Computer-Aided Productivity Improvement System.** Contact: C.H. Pete Link & Associates, P.O. Box 13635, Arlington, Texas 76013.



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EDITORIAL

Time for a New Script

While the wizards of cinematic special effects often portray the computer as an elaborate device with flashing lights that works on such complex problems as spacecraft monitoring, the role that computers play in the work place — a far more banal scenario — is beginning to call for a new script.

During the past decade, automation has made significant inroads into the work place — on the factory floors and in the clerical pools. Now the technology is reaching up into the ranks of middle and executive management.

The prospect of a large segment of workers being displaced by automation is creating a stir in the labor movement. In fact, technology issues may revitalize the entire union movement, which lately has been viewed in some quarters as primarily a vehicle for obtaining cushy fringe benefits packages.

The "Technology Bill of Rights" adopted by the International Association of Machinists and Aerospace Workers [CW, Sept. 6] is an encouraging beginning. This manifesto seeks to ensure that the quality and content of jobs will be enhanced rather than denigrated by automation. In other words, machines must fit the needs of people rather than vice-versa.

Other unions are seeking to involve workers in management decisions to automate, a subject about which workers are rarely consulted.

Technology issues are admittedly in the nascent stage when it comes to unions. In the future, perhaps these organizations will serve as a catalyst both for ensuring that automation preserves the quality of the work place and for permitting automation to fulfill the productivity gains required by U.S. industry.

Unions would be wise to cope with the challenge of automation by balancing both sides of the coin rather than falling prey to the paranoia that the prospect of automation often provokes.

DATA PAST

Five Years Ago
Sept. 12, 1977

NEW HAVEN, Conn. — A special agent for the U.S. Drug Enforcement Administration (DEA) allegedly embezzled computer printouts from the Narcotics and Dangerous Drugs Information System for use in a scheme to identify DEA informants and facilitate importation of marijuana, according to a grand jury indictment issued here.

— — —

NEW YORK — Judge David N. Edelstein, apparently agreeing with government charges that IBM withheld certain damaging information from government trial attorneys, decided to appoint an examiner to search the corporate files of the computer giant.

The information the Justice Department wanted was IBM's Lease Base Machine Inventory and Purchase Base Machine Inventory, both part of IBM's management information system.

Ten Years Ago
Sept. 6, 1972

WHITE PLAINS, N.Y. — IBM raised the rates for systems engineering services, some field engineering services and the minimum monthly maintenance charges on selected pieces of equipment.

The price rise for systems engineering services was between 5% and 10% and would affect the greatest number of users, while the higher rises for field engineering services was to affect only those customers with purchased machines.

— — —

SALT LAKE CITY, Utah — A programmable front-end processor that could support non-IBM terminals as well as replace IBM communications controllers was introduced by Sperry Univac.

The 3760 communications controller was said to be plug-compatible with the IBM 360/370 mainframes and marked Univac's initial offering as an IBM replacement vendor.

U. S. CITIZENS
Future UNIVERSAL NUMERIC IDENTITY SYSTEM
Immigrants
Proposed EMPLOYMENT NUMERIC IDENTITY SYSTEM
Jim Orton Computerworld

LETTERS

Mips and Measurement

While I appreciate the difficulty in using charts to compare performance among computers from various vendors [CW, Aug. 2], I must comment on the inherent flaws in using millions of instructions per second (Mips) as a measurement of CPU throughput.

I found the *Computerworld*-estimated Mips ratings for Honeywell, Inc. DPS 6/92 and 6/96 32-bit superminicomputers to be far below other conclusions. The chart indicates a Mips rating of 0.62 for each processor.

Other thoroughly documented benchmarks conducted by Honeywell and others show Mips for these machines to be as high as 1.8.

However, I'm not writing merely to suggest a correction to your figures vs. ours. It's the practice of applying Mips to CPU throughput that I feel is both misleading to the reader/user and potentially dangerous to the vendor.

As you will agree, an "instruction" in one system doesn't always do as much work as an instruction in another. Some CPUs have mostly simple instructions that go very quickly, but it takes many of them to do anything useful.

Other computers are designed with more complex instructions; each one takes longer but you don't need as many. A system of the first kind can have a much higher Mips rating than one of the second, without giving a user any more real horsepower.

I encourage *Computerworld* to use its influence to push for a Cobol equivalent to the Fortran Whetstone program, where CPU performance is based on a rigidly defined program statement that removes all variables and optimizing, which together cloud the interpretation of Mips.

Perhaps the U.S. Steel benchmark, widely recognized in the industry but not even a de facto standard, could be used.

I know Honeywell is not alone in its aversion to quoting Mips figures on its processors. Let's see if we can all work through the established DP organizations to formulate a totally objective program for use by all processors to arrive finally at a valid test of machine power.

Jessie W. Mobley
Director
Product Marketing Support
Honeywell, Inc.
Waltham, Mass.

Opportunity to Explode

I am writing in reference to " 'This Is a Computer — Have You Paid Your Bill?' " [CW, Aug. 9]. Having been a victim of a computer call, I have firsthand knowledge of the problem. In my opinion, anyone who tries to sell me anything over the telephone is invading my privacy. Once the computer connects, it will not disconnect until there is a response or it runs to the end of its cycle.

I can't imagine anything more terrifying than to have my child choking on something, my husband having a heart attack or my house on fire and not being able to call out for assistance because some uncaring idiot of a company out for a few dollars' profit has my telephone line tied up. My telephone line is for my use only.

Telephone solicitors do not receive a warm welcome in my household. I most wholeheartedly support any and all legislation to force companies to allow a break in the telephone connection. Better yet — legislation completely outlawing computer calls.

Thank you for the opportunity to explode!

Sheri Sweet
Programmer/Analyst
Central State University
Edmond, Okla.

SOFTLINE/Werner L. Frank‡

Micro Software/Hardware: The Profit Picture

In a previous column, we addressed the overall economics of software distribution for computer programs aimed at the microcomputer marketplace [CW, Aug. 30]. We presented a business model for the distribution network, including the author, publisher, distributor and retailer/dealer. We showed that while the software author and publisher have substantial opportunities for leveraging profitability, the distributor and dealer face the squeeze typical in a consumer-oriented marketplace.

Another important dimension in marketing is the selection of a pricing strategy to generate optimal returns to the various participants in the marketplace. A sensitivity analysis based on varying product prices can provide the analytical basis for making such marketing decisions.

If we postulate a software product with a retail price of either $200 or $400 and assume a four-to-one reduction in sales volume resulting from doubling the price, we obtain projected sales of 25,000 and 6,250 units, respectively. This produces the following comparison, given the indicated participant's share of the retail sales price:

Product Price	**$200**	**$400**
Units Sold	**25,000**	**6,250**
Total Retail Sales	**$5 million**	**$2.5 million**
Author's Net at 10%	**$500,000**	**$250,000**
Publisher's Net at 35%	**$1,750,000**	**$875,000**
Distributor's Net at 20%	**$1 million**	**$500,000**
Dealer's Net at 35%	**$1,750,000**	**$875,000**

	Price		Cost of Goods		Gross Margin		Cost of Sales		Hardware Unit Profit		Software Unit Profit		Total Profit*	
	H	S	H	S	H	S	H	S	$	%	$	%	H	S
Retailer	$4,000	$500	$2,800	$325	$1,200	$175	$800	$100	400	10	75	15	20	3.75
Distributor	2,600	325	2,000	225	600	100	400	65	200	8	35	11	10	1.75
Manufacturer/ Publisher	2,000	225	800	50	1,200	175	600	130	600	30	45	20	30	2.25
Developer/ Author	800	50												

(H = Hardware; S = Software)

* Assume sale of 50,000 units. Figures are in millions of dollars.

Software/Hardware Economics

The pretax profit for each participant can be derived through the following process:

1. Assume the author's cost of development is $100,000. The net profit for each example would then be $400,000 and $150,000, respectively. Clearly, the higher volume produces greater benefit.

2. The publisher has a fixed cost of $30 for each unit of software sold to cover packaging and advertising. The remaining costs of marketing and administration are variable and comprise 25% of the net sales. Thus:

Product Price	**$ 200**	**$ 400**
Publisher's Net Sales	**1,750,000**	**875,000**
Fixed Costs	**750,000**	**187,000**
Variable Costs	**562,000**	**281,000**
Pretax Income	**$438,000**	**$407,000**

Obviously, the publisher has little to gain from this price differential if the evaluation is based only upon net income received.

3. The distributor and dealer essentially share their combined overall profit, estimated at 20% of the retail price. For the two cases at hand, this amounts to a significant absolute differential — $1 million vs. $500,000.

Assuming that the unit sales volume increases by more than the ratio of the decrease in price, we conclude that the author and distributor/dealer are likely to derive significant benefit from low unit prices.

Quite apart from arithmetical calculations, lower prices render an additional benefit if they result in higher sales volume. They facilitate market penetration. This in itself is a positive factor in establishing the product. Market share begets more sales on its own account, and once the product is well established, there is always the prospect of raising the price to obtain further advantages.

Hardware Impact

Now we examine yet another factor, the impact of the hardware sale that may accompany the sale of software. Traditionally, hardware sales have led to software purchases. To attract the buyer, the computer store dealer offers heavily discounted hardware, hoping that ancillary purchases of peripherals and software at more favorable margins will enhance profitability.

Today the trend is toward identifying desirable software first and then purchasing the hardware necessary for its operation. How will this change the pricing and buying factors in microcomputer retailing?

We postulate a model reflecting the sale of a microcomputer system at a list price of $4,000 with an accompanying purchase of $500 worth of software. This software purchase at 12.5% of the hardware value reflects present marketplace experience with first-time buyers.

The accompanying chart breaks down the price and cost structure, showing the participation of retailer, distributor, manufacturer/publisher

(Continued on Page 68)

READER COMMENTARY/Kenneth Wozniak‡

Rethinking Ethics for DP Professionals

An increasingly important and relevant topic in the field of social ethics is professional ethics. For those of us in the data processing industry, professional ethics means ethics for DP personnel. Donn B. Parker's article, "Ethical DP Behavior Requires Action Plan" [CW, Aug. 16], aimed at sensitizing us to the need for ethical concern among DP professionals.

Parker's choice of the term "comprehensive action plan" revealed his concern that language about professional ethics be translated into tangible results in the actions of programmers, analysts, operators and managers.

We should all be grateful for Parker's efforts at helping us to consider the meaning of ethics for computer professionals.

In listing his 10 elements of a sound plan of action for encouraging ethical behavior, Parker made some points that deserve to be underscored. The role of exemplary behavior, for example, especially on the part of upper management, must be stressed, particularly if the behavior is accompanied by attitudes and speech that mitigate against any possible charge of hypocrisy or egoistic self-interest.

The use of rehabilitation programs is a strong and clear demonstration of corporate concern for the long-term well-being of employees. Such a concern is one of the social responsibilities incumbent upon any firm that is motivated by a concern for overall social betterment, not just corporate profits.

To focus attention on ethics through briefings, courses and reading is a fine way to encourage the general development of employees and diminishes the need, in many cases, for employee rehabilitation.

Driving Motive?

I cannot, however, give wholehearted approval to what Parker wrote. Central to his article was the notion of the need to develop a code of ethics, with attendant sactions, penalties, punishments and rewards, in order to encourage ethical behavior. From one of his previous discussions I suspect that the main driving motive behind his emphasis upon code development is a concern to secure public trust of the DP profession and thereby to ensure power, privilege, authority and monopoly.

In *Computer Abuse*, authored by Parker, Susan Nycum and S. Stephen Oura (Washington, D.C., National Science Foundation, 1973), pp. 68-69, Parker wrote: "While the community may value the services provided by a profession, the latter is dependent upon public trust for its powers and privileges. Furthermore, to retain this monopoly and authority, a profession makes explicit the collective claim of its members of their commitment to social welfare and to ethical codes of conduct supported by a self-regulative control mechanism not to abuse (and therefore to protect the sanctity of) this trust . . .

"Thus, declaration of the code of ethics is a necessary condition for the establishment of public trust in a profession which, we have argued, then permits the professional group to attain authority and a monopoly over its service."

It is at this point that Parker goes awry on his understanding of the nature and purpose of ethics, as well as the means by which good behavior is encouraged; for ethics is more than the development and enforcement of codes, and the goal of desirable behavior is not best served through the threat of penalty or the promise of reward.

Furthermore, the purposes of professional ethics should not include the attainment of power, privilege, authority and monopoly.

Darrell Reeck, a professor at the University of Puget Sound, reminds us in *Ethics for the Professions,* (Minneapolis: Augsburg Publishing House, 1982), p. 69, that professional codes were in effect during the Nazi era, yet the ethics of the German professionals were never more reprehensible.

Additionally, Reeck notes that former President Nixon's lawyers committed disreputable acts in spite of the code of the American Bar Association, which they had all presumably affirmed.

It simply is not the case that codes — even when accompanied by sanctions — instill within people convictions regarding proper action. They make demands, but they totally lack enabling power.

If professional ethics does not primarily have to do with codes and sanctions, or the securing of power and the like, then what is its concern? The answer to such a question would fill volumes, so I will limit myself in this article to the fundamental issue — the meaning of ethics within a professional group.

It is necessary to discuss ethics for a specific professional group as opposed to ethics in general because of

(Continued on Page 64)

READER COMMENTARY/Jack Bologna‡

Managing High-Tech Employees: Perceiving

Are high-technology workers different from workers in other industries?

That they are different will be attested to by any number of managers who have had the burden of supervising computer and information science professionals.

But how do these modern-day Einsteins, Pasteurs, Picassos and Edisons differ from workers in other professions? In particular, information processing professionals have a strong need for achievement and feel little need for relationships and affiliation.

Other Attributes

There are many other attributes that can be observed in computer and information science professionals and other types of high-tech employees. Some of these are:

- They identify with their art or technology more than with their organization's goals. As a consequence, they tend to be more mobile and quicker to change employers.
- Salary and fringe benefits (financial returns) are not as important to them as the meaningfulness of their work.
- They are more task-oriented than they are relationship-oriented, so relationships with peers and superiors are not as important to them as getting the job done and getting it done right.
- They supply their own motive power and neither need nor desire close supervision. They work well — perhaps best — on their own.
- The tasks they enjoy most are those that are challenging. Routine and maintenance-type tasks are not much to their liking.
- They prefer their leaders to be supportive, participative and achievement-oriented, rather than maintenance-minded or directive in style.
- They tend to be more vocal about their feelings and they fear retribution less than other types of employees (perhaps because their talents are in such great demand and other employment opportunities abound).
- They place a premium on tasks that require a variety of skills and activities and can be accomplished in whole or major part with a substantial amount of personal autonomy and discretion over the procedures to be followed and the scheduling of their time on the task.

High-tech employees enjoy getting feedback on job performance from the job itself, in other words, their own tangible outputs. They seem to be better able to critique their own work than other employees and in fact prefer that to supervisory feedback or evaluation. They can be highly self-critical of their own creations or outputs.

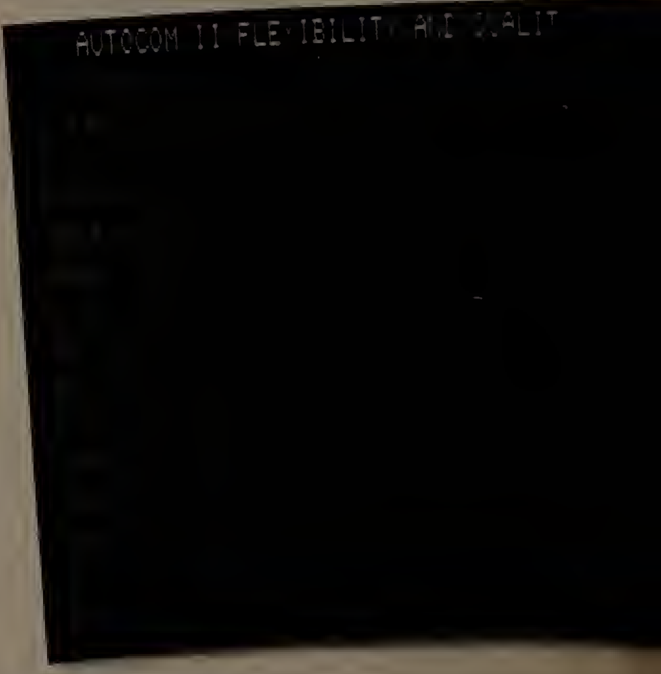
They resist unnecessary constraints and controls on their time, their professional judgment, their personal autonomy (freedom to move about) and their integrity.

In a nutshell, high-tech people tend to be energetic, ambitious, responsible, self-disciplined, careful, methodical, logical and outspoken "loners." They can work with others, but their satisfaction comes mainly from the job or task itself.

Managing these employees can be a trying experience for a manager who lacks a background in their disciplines or who does not share their qualities, values or mental disposition.

But is it any easier for the manager who has come up through the ranks of their own disciplines? Probably not. It may even be more difficult.

The assumption that a truly great scientist, for example, can better supervise other great scientists does not seem to be borne out by research. The "loner" in a management role has a lot of lessons



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to learn before he can become an effective supervisor.

The temptation to *do* (task orientation), rather than to supervise or review, is greater than it would be for the nonspecialist manager. And if information processing professional supervisors continue to *do* things, rather than delegate them, they frustrate their high-tech subordinates.

The generalist can at least confess ignorance, but the specialist is supposed to know and knowing makes the specialist want to do. They also seem reluctant to let subordinates make mistakes.

The very talents and virtues that bring specialists recognition and promotion may well get in the way of their effectively managing former colleagues and peers. Newly appointed high-tech managers must master a new set of skills if they are to succeed.

Skills in interpersonal communications, in delegation and in motivation of others will be required.

You are supposed to be creating an environment in which your subordinates can realize their potential. Your satisfaction is now to be realized from seeing to their growth. If you do their work for them, you may be growing, but they are not. They are stymied.

The reward for the high-tech manager should be the knowledge that his subordinates are growing professionally. This calls for a mentor relationship with subordinates, not an adversarial or power-based relationship.

You aren't there to compete with your troops or to show off your genius. You can best serve their growth and job satisfaction needs if you have high expectations for their success and maintain a work environment that provides continuous challenge, task and skill variety and freedom from bureaucratic restraints.

The usual justification for treating high-tech people like children is that their behavior at times seems childish — petulant, withdrawn and supersensitive to criticism. But those childish characteristics are understandable when one considers that high-tech employees behave that way because they have not lost their adolescent wonder and curiosity.

Everything is amazing and amusing to them, except for convention. Convention is a block to creativity. Conventional wisdom has no merit to them. Convention says: "it can't be done." But they know better. Anything can be done or done better.

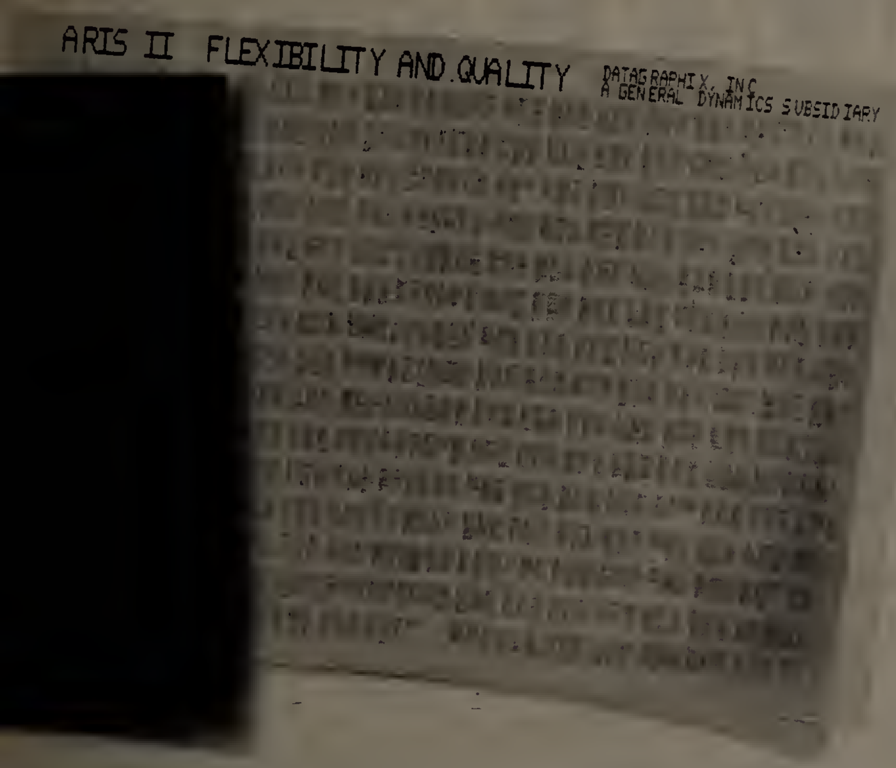
So the high-tech employee, in fact, is not so much childish as "childlike." They are the eternal students, always searching, always seeking, never satisfied with the status quo or with things as they are.

The prospect of managing a group of high-tech employees may seem difficult or impossible to managers conditioned by traditional notions of work behavior. The mailed fist must be replaced by the silk glove. Direction must give way to participation, involvement and negotiation.

Formalized planning and communicating may have to be given up for less formal arrangements. Delegation may have to be practiced by assumption of responsibility rather than by conferral. Control may have to be experienced by self-discipline rather than by impositions from higher authorities.

While the investment in the growth and development of high-tech employees is necessarily great, the return is likewise great.

Bologna is president of Odiorne International, Inc. in Plymouth, Mich.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Professional Ethics for DP Personnel

(Continued from Page 61)

the unique nature of any profession. Among other things, a profession is something of a distinctive culture with its own symbols, language, attitudes and customs.

In addition, any profession develops values. As a distinct group with values, it needs to be concerned with the meaning of ethics for its members qua members of that group as opposed to any other group and as peers rather than inferiors and superiors.

The distinction between morality and ethics is, in the minds of many people, a cloudy one. Yet the distinction, as regards professional ethics, is central to the issue under discussion.

Morality has to do with norms of conduct and the approval of such norms. Those norms are external standards placed upon people to which conformity is required before approval is bestowed.

Codes and Ethics

Codes of conduct, then, fall under the heading of morality. Ethics, on the other hand, has to do with reflection upon conduct and evaluation of conduct as good or bad. Justification of moral norms, the nature of good and bad, evaluative arguments, levels of motivation, moral epistemology, theories of obligation and the like fall under the category of ethics.

It is within these categories, not just the category of a code of conduct, that any kind of professional ethics, including ethics for DP professionals, must concentrate its efforts if it is to be viable and usable within that particular profession.

Codes, though useful at times, are insufficient to encompass the complexity of ethical situations encountered by professionals, especially if managers seek to make the subordinates conform, in all ethical situations, to the codes and thus are often viewed by those subordinates as irrelevant or archaic.

To stress thinking about ethics as described above, however, is to encourage people to take seriously moral dilemmas and to seek to produce their own workable solutions.

Within any profession's ethics two arenas may be defined: personal ethics, which is reflection upon and evaluation of the conduct of individuals, and social or corporate ethics, which is reflection upon and evaluation of conduct of corporations.

Sadly, most professional ethics up to the present has emphasized the personal side of ethics to the neglect of the social or corporate side. Yet any corporation that expects its employees to take personal professional ethics seriously must itself, prior to that expectation, take corporate professional ethics seriously.

For example, how can a company rightly expect its employees to lay aside racial prejudice during review proceedings while simultaneously investing in the racial injustice in South Africa?

In the words of Charles S. McCoy, Mark Juergensmeyer and Fred Turning in "Ethics in the Corporate Policy Process: An Introduction" (Berkeley: Center for Ethics and Social Policy, 1975), p. 3: "If we are really concerned about the quality of our world, we must go beyond individual ethics and develop ways to understand and improve the ethics of organizations."

One caution is in order here. Virtually any company or profession, when asked, would assert that it contributes to the public well-being. That claim must be evaluated, however, in terms of the motive that lies behind the alleged ethical conduct. Was the conduct merely a type of window dressing intended to obscure the real driving force, that is, power or profit or authority or monopoly? Or was it truly an action that grew out of a concern to improve the social situation?

Rightly motivated ethics will be concerned for society's trust and well-being as ends in themselves, not as a means to secure corporate or professional self-interests. To use a code of ethics as a means to promote self-interest is itself an abuse of that

(Continued on Page 68)

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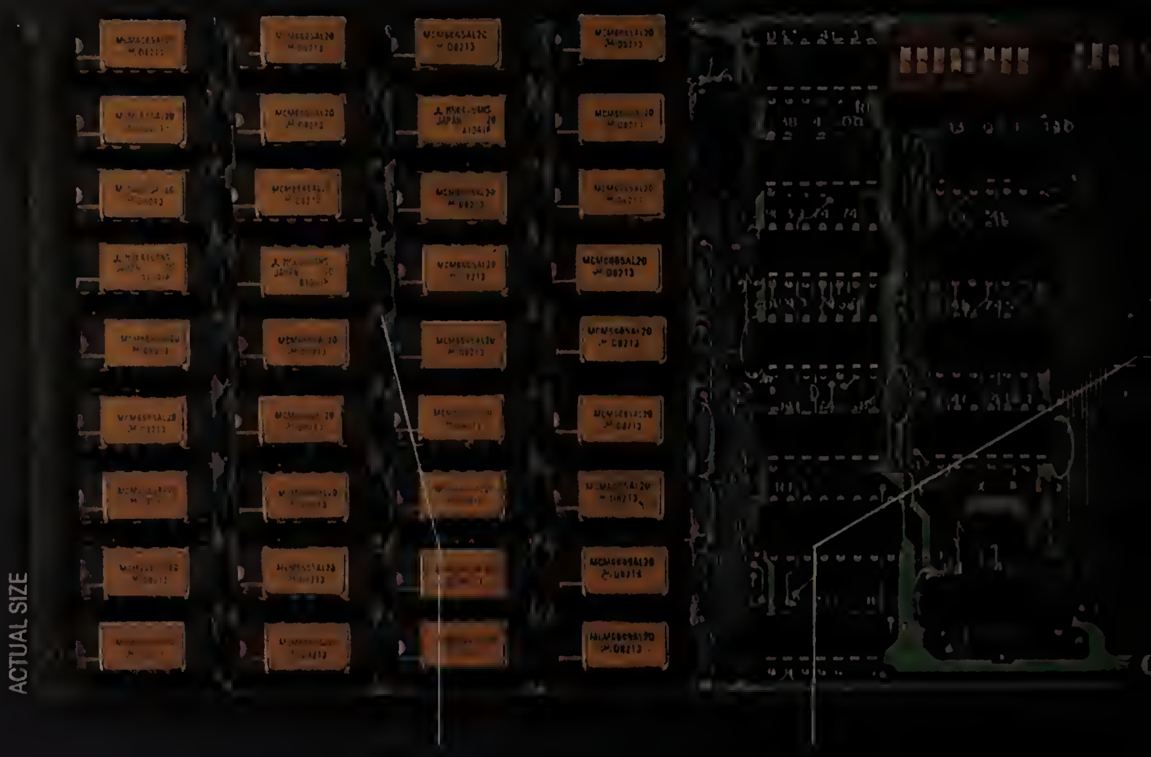

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READER COMMENTARY/Nancy Twito Morris‡

Tech Writers Identifiable by Their Sneakers

To be a good technical writer requires many skills. You must be able to determine what documentation is desired or required, which frequently resembles playing pin the tail on the (ahem) donkey.

You must be a quickdraw expert at answering: "What does a technical writer do?" and carry in your briefcase justification for your existence.

You must have a Beckett of patience in order to work with people whose highest praise is: "You might even be a good programmer someday."

You must have the ability to generate high levels of adrenaline to keep yourself awake while writing operating procedures.

You must have the gentle touch of a June breeze and the effect of a monsoon while editing analysts' work.

You must be able to humbly acknowledge your role as an uneducated orphan in a DP environment and chuckle believably upon hearing, "Every shop needs documentation to keep the janitors in work" for the twenty-third time.

You must have Lord Peter Wimsey's tenacity to be able to translate programming "genius" into English. You must be as ruthless as a New York City cop while asking questions. You must be willing to sacrifice your intellect, your integrity and your soul in arbitrating the writing of business requirement specifications.

I felt I met these qualifications, and so entered the field of data processing technical writing. It was not my first, second, third, fourth, fifth or sixth career choice, if you must know the truth.

Nevertheless, the salary range is higher than that for teachers and a typical workday allows me time to write letters, create and recreate shopping lists and sift through my schemes for the future (in other words, life after data processing).

Trouble of Late

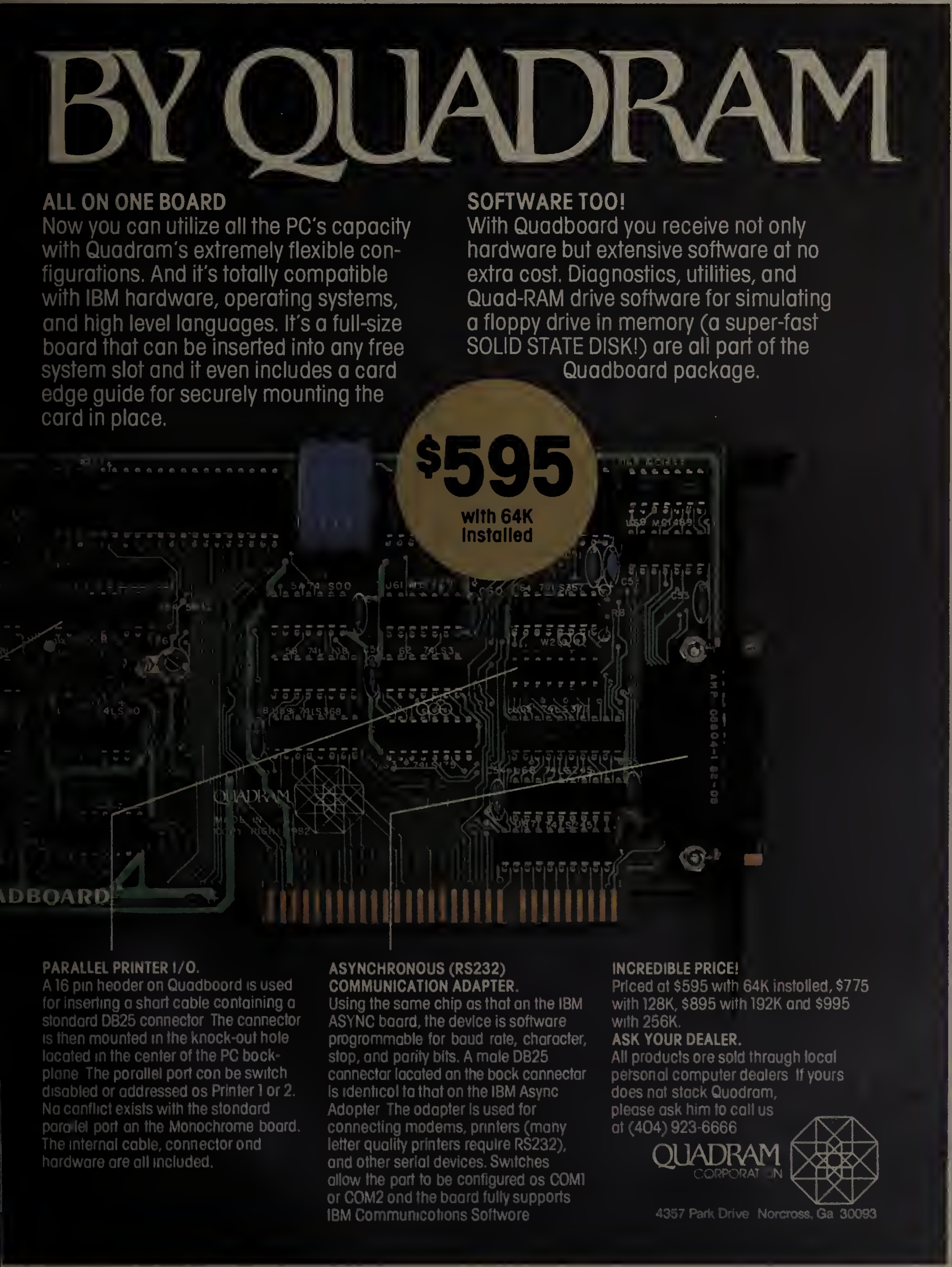
Lately, though, I've been having trouble. Before leaving for work each morning, I take my temperature to make sure I'm not harboring a fatal flu virus; I inspect each of my car's tires — square inch by square inch — for slits that may render it unsafe; I return to the house several times to make certain the dogs have been fed and watered; and I appeal to my husband's sense of bravado by daring him to run off with me to Majorca. (He, having at the moment only small doses of the trouble I'm having, politely declines.) Ultimately, I go to work.

Once there, I stroll to my desk, "good morning-ing" and smiling along the way.

A tech writer generally has a liberal arts orientation and, among a run of programmers and analysts, is noticeably more outgoing than the norm. We've been given the task — albeit by default — of carrying the banner of human manners into the house of high technology.

Tech writers are easily recognized in a large data center by their sneakers — they match.

Morris lives in West Orange, N.J.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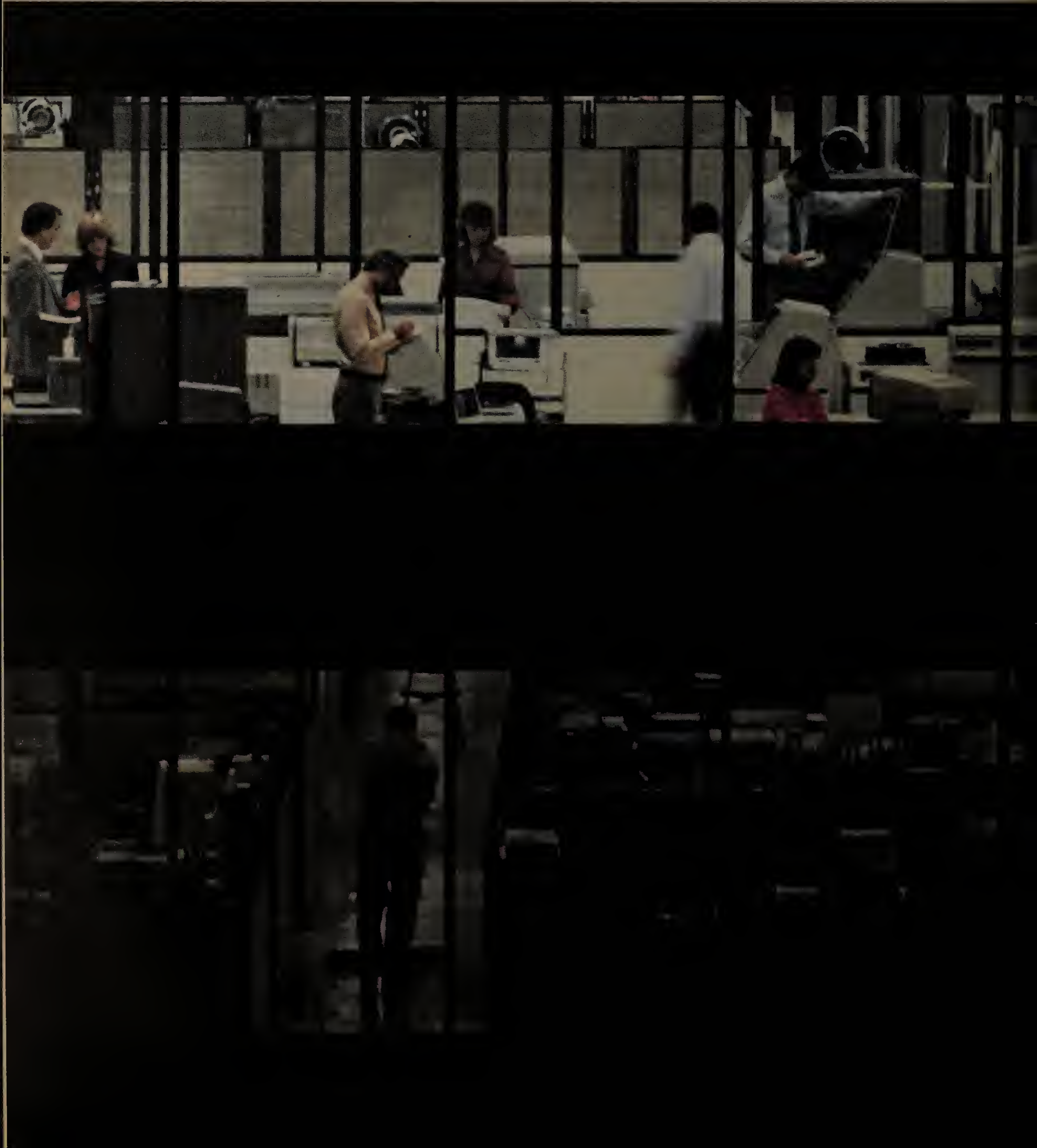

more this year. But there's a way

That 17% isn't just an estimate. It comes from a survey of EDP departments across the country, taken by *Computerworld* in December, 1981.

There's nothing blue-sky about the second figure, either. That 500% gain in productivity was reported by Dick Hamilton, an independent contractor who develops programs for Weyerhaeuser Company. He's been able to write new applications 5 to 20 times faster, because the programmer productivity tools we've designed for our HP 3000 computer system are so efficient.

Programmers save time.

The 500% increase we mentioned is just one example. We've seen our tools deliver results like these time and time again. In every area of EDP activity. From outlining new projects in much less time, to eliminating countless numbers of programming steps, to cutting software maintenance costs in half.

But whether you spend 10 months or 10 days developing a new application, it's a valuable asset to your company. And clearly, the best way we can increase your ROI is to help you protect that software investment. That's why we design every new HP 3000 to be software compatible with all our earlier models. Which means you can upgrade to a newer, more powerful HP 3000, or add more systems to build a network. Without changing one line of code.

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Of course it's important to save money in your EDP department. But it's even more important to make the best possible use of your programmers so they can spend more of their valuable time developing special applications that save money across your entire company. And we have a long list of software tools which help them do just that.

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We've pulled it all together.

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Rethinking Ethics for DP Professionals

(Continued from Page 64)

trust and thus constitutes ethically despicable action. Presuming, however, that the motive was honorable and that the company or profession does have a legitimate social concern, it then can pursue personal professional ethics among employees or members and remain ethically consistent.

The notion of motive should be at the heart of professional ethics. What is it that should motivate DP professionals to engage in right action, however defined, and how can that motivation be encouraged? The common motivation behind a code is fear of punishment for noncompliance and hope of reward for outstanding behavior.

Parker defined these punishments and rewards in financial and promotional terms. Yet this level of motivation is among the lowest. It is the kind of motivation we employ in dealing with little children. We give them standards of conduct with attendant promises of reward and punishment for compliance or noncompliance, respectively.

When children get older, however, we explain the rationale behind the standards. As they continue to mature into adulthood they are encouraged to internalize morality, that is, to develop for themselves convictions regarding right and wrong and legitimizing arguments behind those convictions.

Morality is no longer legislated by parents. Similarly with professional ethics, to impose a code upon adults, and highly trained professionals at that, is to insult both humanity and the professions. Rather, people should be treated with dignity. Professional ethics must be internalized. Appeal should be made to such notions as character, responsibility, professional goals, corporate and social consequences, honor, justice, consideration and love.

To develop professional ethics among DP personnel is to encourage, through reading and discussion, thinking about the impact of responsibility, character, values and professionalism on the working situation. It means to enable people to resolve for themselves ethical conflicts and to be able to defend rationally their resolutions in a way that comports with human dignity.

Concurrent with the efforts at motivation should be the opportunity for dissent. Part of respect for human dignity is the allowance for divergent opinions. While sensitizing professionals to ethical concerns, the corporation must become vulnerable enough to accept and entertain criticism. Only in so doing will it earn the respect and trust of employees.

In summary, then, we must keep in mind four ideas when attempting to develop ethics within the DP profession. Codes and rules should be deemphasized.

Threats and promises, an external motivation for ethics, are an insult to human dignity. Corporations and professional groups must demonstrate a consistent, commendable social ethic out of a concern for societal well-being before expecting employees to demonstrate commendable personal professional ethics.

Finally, motivation must come through appeal to internal ethical qualities and convictions. When these ideas are central to thinking about professional ethics, then professionals will become more serious about ethics.

Wozniak, who holds a doctorate in social ethics, is currently working as a systems analyst at City National Bank's computer center in Los Angeles.

Analyzing Micro Prices

(Continued from Page 61)

and developer/author for both hardware and software. For both, the list price, cost of goods, gross margin, cost of sales and profits are displayed. The assumptions underlying the cost of goods as a percent of unit list price for each participant in the sales cycle are as follows:

	Hardware	Software
Retailer	70%	65%
Distributor	50%	45%
Manufacturer/ Publisher	20%	10%

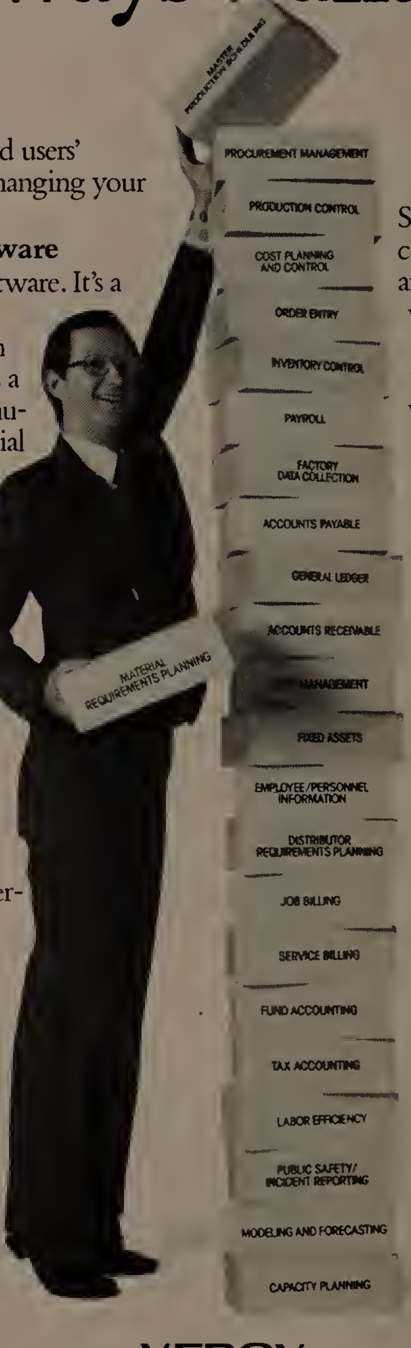
The cost of sales as a percent of unit list price assumes:

	Hardware	Software
Retailer	20%	20%
Distributor	10%	13%
Manufacturer/ Publisher	15%	26%

The analysis leads to the conclusion that the before-tax profit rates for the hardware and software would be 30% for the hardware manufacturer and 20% for the software publisher, after deduction of the author's royalty. The profits generated by the retailer and distributor, however, may have to be compromised by competitive discounting and large purchase deals, both of which are common.

The conclusion is the difference in absolute value between the total profits generated from hardware and software. The model shows that profits from hardware are almost a decimal order of magnitude greater than those generated from software. Shouldn't this drive the software company into the hardware business to get a share of the rewards?

Frank is executive vice-president of Informatics General Corp. in Woodland Hills, Calif.



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Remote Management System For Execs Based on 'Mapper'

BLUE BELL, Pa. — Sperry Univac has announced a remote management service for corporate executives based on its Mapper applications development system.

The service will be based on a management-oriented utility — using the Mapper system — from an Executive Information Service Center here. The Executive Information Service was designed to bridge the gap between operational information from traditional DP sources and true executive information needed for executive decision-making.

Available via a telephone-linked CRT terminal, the service enables users to "become the architects and users of their own personal information network," according to the vendor.

With a minimum monthly fee of $500, Mapper software costs $250/mo with a $20/mo usage charge, $7 per 1,000 I/Os, 7 cents for storage of 1,000 line/day, $20/station registration fee and $10/report registration fee. Univac can·be reached through P.O. Box 500, Blue Bell, Pa. 19424.

Datacom/DB Release Gets Index Management

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) has added index management capabilities with Release 7.3 of its Datacom/DB, a multithreaded data base management system (DBMS) for IBM OS/VS and DOS/VS(E) sites. Datacom/DB is the underlying DBMS for ADR/Datacom.

The major enhancement in Release 7.3 is the Relational Index System (RIS), which reportedly balances free index space without the need for traditional bit maps or block chains. These techniques permit more efficient free-space management, ADR said.

RIS reduces CPU requirements and I/O events by one-third to one-half, ADR claimed.

Other enhancements to Datacom/DB include the ability to support up to 999 data bases and their associated indexes; an additional user program entry point, which includes services to improve performance and enhance audit trails and security capabilities; device support for IBM 3375 and 3380 disk drives; and improved dump and statistical file handling, the vendor said.

Release 7.3 is available with ADR/Datacom. The permanent license price for Datacom/DB starts at $66,200 for OS sites, $54,600 for DOS and $41,000 for operating systems that run on the IBM 4321, 4331, 370/115, 370/125 and 370/135. ADR is based at Rt. 206 & Orchard Road CN-8, Princeton, N.J. 08540.

Inventory Aid Out for IBM

JERICHO, N.Y. — Computer Associates International, Inc. has taken its first step into the applications software market with an on-line inventory control and distribution management program for IBM and plug-compatible mainframes.

CA-Prisms is adaptable for use by manufacturers, wholesalers, retailers or any organization with a finished goods inventory, its vendor said. Its integrated on-line modules reportedly include order processing, mail order processing, inventory control, purchasing, bill of materials, sales analysis, accounts receivable, accounts payable, general ledger, management inquiry and reporting, security access and a user report generator.

A perpetual CA-Prisms license costs $85,000, Computer Associates said from 125 Jericho Tnpk., Jericho, N.Y. 11753.

Hero 2.0 Supports All MVS Versions

SUNNYVALE, Calif. — A program development system that was introduced about a year ago as a replacement for IBM's TSO has reportedly been enhanced to work with all currently available versions of MVS.

The Software Authority, Inc. has revised its original Hero system to produce a second release that supports MVS in both its free and for-fee versions, including MVS/SP 1.1 and SP 1.3. Hero 2.0 thus works in a wider range of IBM environments than Hero 1.0, whose MVS support is limited to the operating system's free version, Release 3.8, a Software Authority spokesman said.

Differences

Unlike the original Hero offering, Version 2.0 also supports IBM's System Network Architecture (SNA), Synchronous Data Link Control (SDLC) protocol and the Model 3767 dot matrix printing terminal in both the SDLC and start/stop modes.

Trial copies of Hero 2.0 are now being made available to interested users on a first-come, first-serve basis. The "no-strings" trial offer allows prospective buyers to test the latest Hero release free of charge for 30 days, the spokesman said.

Interested users can qualify for the offer merely by providing The Software Authority with their CPU serial number and operating system release number.

Except for its expanded software and communications support, Hero 2.0 provides basically the same features and capabilities as the original release. Both versions are intended primarily for medium- and large-scale IBM or IBM-compatible data centers that currently use TSO but find it overly hoggish of systems resources [CW, Aug. 31, 1981].

Like the original Hero version, Release 2.0 allows, for example, an IBM 3033-class processor to support 250 to 400 concurrent programmers, compared with 60 to 80 programmers for TSO, the spokesman said.

(Continued on Page 70)

Exec Sees IBM Succeeding In MVS-for-Fee

By Jeffry Beeler
CW West Coast Bureau

SUNNYVALE, Calif. — IBM is succeeding in its efforts to encourage MVS users to migrate from the free to the for-fee versions of its popular batch-oriented operating system.

That conclusion comes from The Software Authority, Inc.'s President David Alderman, who bases his opinion on the results of a recent survey that shows MVS users increasingly converting from the system's free versions to its SP versions.

Alderman and his colleagues earlier this year obtained from a market research company a magnetic tape listing 1,500 MVS sites around the U.S. and tried to survey as many of the installations as possible by phone. Of the 980 sites that responded, almost 80% described themselves as users of one or another form of either MVS/SE or MVS/SP, Alderman said.

The survey also revealed an "overwhelming" user preference for the latest of IBM's MVS releases, MVS/SP 1.3, Alderman said.

If the trend toward MVS/SP 1.3 continues at its current pace, most of the DP installations that participated in Alderman's survey will convert to the latest MVS release within the next six months, he predicted.

"What these findings mean is that IBM has fared very, very well in its attempts to woo people away from the free versions of MVS," Alderman said. "IBM's success in convincing its customers to buy its MVS releases will give the company a little more control over its own destiny."

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Speed Updates, Testing

Packages Boost CICS Performance

NEW YORK — A series of four software packages that are said to boost IBM CICS systems performance, speed updates and applications programs testing and increase programmer productivity by as much as 300% is being marketed here by Loris Data Associates, Inc.

Eazy/CICS products allow applications and systems programmers to look into the CICS and OS environment as well as update CICS without bringing the systems down, according to the vendor.

Eazy/Find is a transaction package designed to aid systems and applications programmers develop and debug programs. It costs $7,000.

Eazy/Table is a table-building module that reportedly permits CICS users to add new entries to the CICS tables (PPT, PCT, FCT) without interrupting the use of the system. It sells for $5,000.

Eazy/Browse enables inquiry, update and search/scan of any file within the CICS environment with immediate visual verification that a file has been updated correctly. It alleviates the wait for batch printouts or the development and run of cumbersome computer-interrupting programs, according to the vendor. It also permits instant forward and backward paging and addition and deletion of records. It is priced at $6,000.

Finally, Eazy/Map is a package used in Basic Mapping Support, which provides a method for generating maps. The programmer need only fill out an 80-col image that describes the appearance of the screen. Eazy/Map is priced at $2,500.

Loris Data Associates is based at 401 Broadway, New York, N.Y. 10013.

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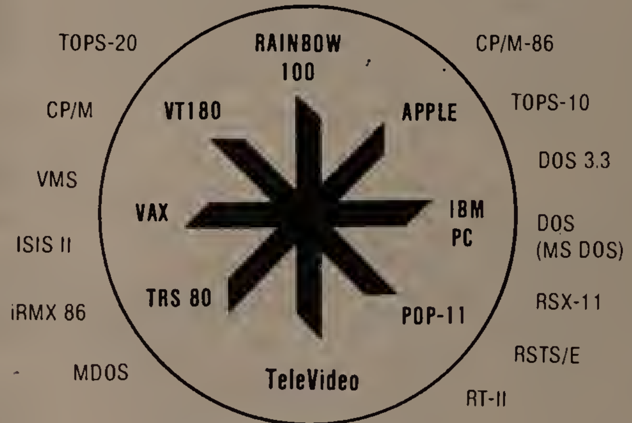

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'Fieldwatch' Gets Tracking Aids

BURLINGTON, Mass. — Data, Inc. has added two tracking products to its Fieldwatch software. The software runs on IBM 370, 4300 and 30 series mainframes and on processors from Datapoint Corp., Prime Computer, Inc. and Data General Corp.

The Saleswatch system tracks sales leads through the selling cycle and monitors salesman performance. The package can also monitor salesmen's day-to-day whereabouts and handle electronic mail, the vendor spokesman said.

Shopwatch tracks internal plant-equipment outages, plant-maintenance people and vendors. It also tracks meantime between failures, vendor response time, equipment history and preventive maintenance, the vendor said.

Saleswatch ranges in price from $50,000 to $150,000, while Shopwatch costs between $50,000 and $130,000, a spokesman said from Data, One New England Executive Park, Burlington, Mass. 01803.

Release 4.0 Of Corodale Tool Aids IBM Users

BOSTON — Corodale, Inc. has announced Release 4.0 of its System/Manager software package for users of IBM DOS/VS(E), adding several enhancements to its three components.

The first of these components is Space/Manager, which reportedly offers simplified space allocation for fixed-block architecture devices. It also enables file space to be calculated automatically in terms of the space requirement of another specified file, simplifying the allocation of work files.

The Tape/Manager enhancements offer a new Tape Vault Management system, which reportedly enables DOS/VS(E) users to maintain a complete inventory of their tapes and their physical location in vaults.

Job Control Language/Manager has been enhanced by the addition of two options: a Power interface and Symbolic JCL.

The Power interface reportedly reduces operator intervention and optimizes scheduling by permitting Power/VS or VSE/Power commands in the JCL of a System/Manager job stream, the vendor said. The Symbolic JCL facility removes much of the need to change JCL either for testing or in production. With Symbolic JCL, symbolic variables are used within the JCL stream instead of file names and devices, according to the vendor.

Release 4.0 of System/Manager costs $7,500 to $22,000, depending on configuration. Corodale is based at 211 Congress St., Boston, Mass. 02110.

Payroll System Fits System/34

MILWAUKEE — Harris Data Service, Inc. has announced an interactive payroll system for the IBM System/38.

The system, written in RPG-III, reportedly takes advantage of the System/38's data base architecture. The system features multicompany/facility reporting for weekly, biweekly, semimonthly and monthly payment cycles, the vendor said.

Up to 10 voluntary deductions are provided for each company/facility in the system. The software costs $4,500 from the firm at 11629 W. Dearbourn Ave., Milwaukee, Wis. 53226.

'Hero 2.0' Supports MVS Versions

(Continued from Page 69)

The two releases also reportedly use basically the same full-screen editor, global editor, command procedure language and interactive document preparation aid, the source added.

To make Hero 2.0 readily testable in a TSO environment, The Software Authority designed its product to support TSO user-identification and data-set naming structures. The twin support features reportedly enable Release 2.0 to satisfy a TSO shop's user-identification and data-set naming needs without requiring any software conversion.

Prices for the latest Hero release vary with a user's CPU size. For IBM 4331-2 or equivalent processors, the development system costs $27,000; for IBM 3081-class machines, $48,500.

Both Hero 1.0 and 2.0 are available from The Software Authority at 1270 Oakmead Pkwy., Sunnyvale, Calif. 94086.

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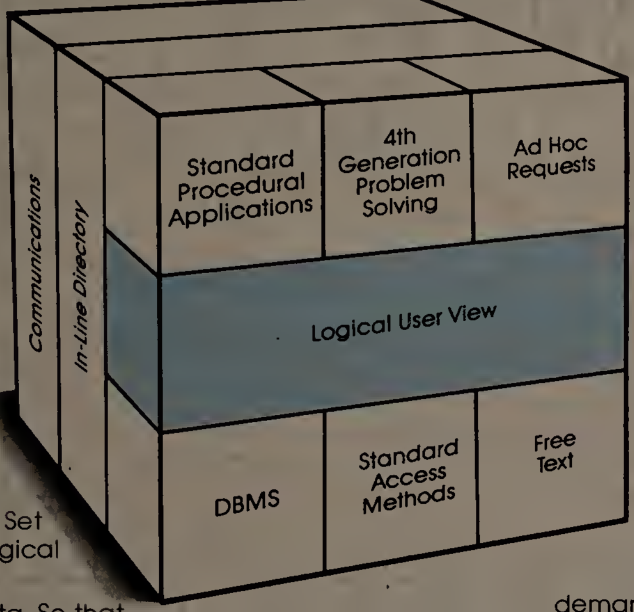

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Accounting Aids Out for 370, 4300

MINNEAPOLIS — A series of packaged general accounting and operational software for the IBM 370 and 4300 series of computers has been unveiled here by Lawson Associates, Inc.

The software incorporates 10 applications including general ledger and report writer, accounts payable, accounts receivable, purchase order, fixed assets, payroll, personnel, order entry, inventory control and equipment and vehicle maintenance. Each module reportedly can be installed separately or can be used with any other module.

Accounting controls, audit trails, prompting and edit checks have been built into this system to ensure accuracy, according to the vendor.

The software is written in structured Cobol and reportedly uses IBM standard CICS, Vsam and DOS operating systems. The 10 modules range in price from $14,000 to $50,000, and the entire bundle is available for $160,000, Lawson said from Suite 390, 2021 E. Hennepin Ave., Minneapolis, Minn. 55413.

Utility Measures Response For IBM 3270-Type Units

LAKE HOPATCONG, N.J. — The Matlen Silver Group, Inc. has announced a utility that reportedly measures live performance in the IBM CICS environment, provides data compression to reduce line traffic and measures response time for IBM 3270-type terminals.

The Line Utilization Control Inquiry (Luci) System is said to be especially cost-effective for users with medium to large remote networks (35+ terminals) running under IBM DOS or OS environments with CICS/VS and Basic Mapping support.

The system costs $8,850/site, with a $1,000/site annual maintenance fee. A free 10-day trial period can be arranged with Matlen, 39 Woodlawn Terr., Lake Hopatcong, N.J. 07849.

Vtam Support For IBM Printers Gets Update

DALLAS — LRS, Inc. has announced Release 3.0 of its IBM Vtam Printer Support System (VPSS) said to provide remote job entry print facilities for IBM 326X and 328X printers.

Release 3.0 is said to support any number of printers from a single address space running the JES 3270 Vtam or Tcam started task. The printers may be locally attached or remote, operating under any combination of bisynchronous and Synchronous Data Link Control protocols.

Release 3.0 is free to users. A perpetual license for VPSS under JES II or JES III is priced at $9,500, with rentals and leases available.

LRS can be reached through P.O. Box 18538, Dallas, Texas 75218.

Data Dictionary Fits System/34

SAUSALITO, Calif. — Positive Results, Inc. has announced a data dictionary for the IBM System/34.

Wizard One is said to meet data base management needs through planning, documenting and controlling records in a system. The menu-driven package reportedly requires 26K bytes of memory.

The software can be licensed for $485/CPU and includes a 30-day money-back guarantee. Multiple-CPU discounts are available, according to a spokesman. Positive Results is located at 37 Willow Lane, Sausalito, Calif. 94965.

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Dysan Flexible Diskettes are also available from all Computerland Stores, Sears Business System Centers, and many independent computer outlets nationwide.

Version 1.1 of 'Vsamcomp' Out For IBM OS and DOS

NEW YORK — Micromax Computer Intelligence, Inc. has announced Version 1.1 of Vsamcomp, its Vsam Cluster Comparison utility for use in both IBM OS and DOS environments.

The user of this product is provided with extensive diagnostic information and formatted detail and summary reports, reportedly enabling him to prevent potential production problems and improve maintenance productivity. The product is planned to support all future Vsam versions of IBM and takes minutes to install.

The perpetual license fee for Vsamcomp 1.1 is $3,000. Micromax is based at 55 John St., New York, N.Y. 10038.

For OS, DOS Environments

Cobol Task-Tracking System Bows

SKANEATELES, N.Y. — A Cobol task-tracking system for IBM OS and DOS environments has been announced here by Energy-Tek Software.

The Quik Project Control System (QPCS) reportedly features automated Gantt chart tracking on two different time scales and allows many users to utilize the same system to track their tasks without interfering with each other. It also features bar charts, the vendor said.

An activity history file is automatically posted as a byproduct of updating the project record, according to the vendor. This feature allows the user to allocate activity by cost center or type of activity for management information concerning resource use.

QPCS will be available for shipment Oct. 15. The Cobol DOS and OS perpetual licenses are $4,100 and $4,800, respectively.

Energy-Tek Software is located at 16 Academy St., Skaneateles, N.Y. 13152.

'Map-Print' Documents CICS Code

OMAHA, Neb. — Consolidated Business Systems, Inc. is offering a program for creating screen documentation from IBM CICS Map Source Code.

Called Map-Print, the package prints the screen as it appears on a CRT screen. Text may be printed with screen through option cards, which the programmer embeds in the CICS Map Source Code, the vendor said.

The package costs $20/mo on a one-year lease or $1,200 for a perpetual lease, the vendor said from the firm located through P.O. Box 6183, Omaha, Neb. 68106.

Compiler, System Fit System/38

HOUSTON — Communication Controls, Inc. has released an IBM System/38 Source File Compiler and an Electronic Message Sending and Retrieval System.

The Source File Compiler features automatic compilation of Control Language and RPG problems and physical, logical, display and printer files from as many as six source files, one source file at a time, the vendor said.

The Message Sending System reportedly features local and remote message capability with application password security.

A license for Source File Compiler costs $375 and for the Message Sending System, $750, a spokesman said from 6606 Long Drive, Houston, Texas 77087.

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Version 3 of VAX/VMS Gets Adabas-M Support

RESTON, Va. — Software AG of North America, Inc. has announced that Adabas-M, its implementation of the Adabas data base management system (DBMS) for the Digital Equipment Corp. VAX-11 series of superminicomputers, has been enhanced to include full data base support of the recently announced Version 3 of DEC's VAX/VMS operating systems.

Adabas-M is a dictionary-driven DBMS utilizing inverted/relational technology, according to the vendor. The reentrant multithreaded Adabas-M nucleus reportedly runs as a detached process under the VAX/VMS operating system. The enhanced version includes support for the VAX-11/730 hardware and software and enhanced buffer handling and error logging.

This product is available for $40,000; it can also be rented on a monthly or yearly basis. Further details are available from Software AG at 11800 Sunrise Valley Drive, Reston, Va. 22091.

Control System Runs on Primos

HAUPPAGE, N.Y. — A manufacturing management and control system designed for manufacturers with 70 or more employees is available from Gull Resource Management Systems, Inc. The package runs under Primos, the operating system for Prime Computer, Inc.'s Information family of minicomputers.

The manufacturing management and control system is menu-driven, includes financial modules and was designed for the multiterminal environment. It includes Materials Resource Planning, Shop Floor Control, Inventory, Sales Order, Purchasing and other modules.

The package costs $66,000 from Gull at 100 Pkwy. Drive S., P.O. Box 9400, Smithtown, N.Y. 11787.

Generator Added to Info

WALTHAM, Mass. — Henco Software, Inc. has introduced an automatic documentation generator as an extension to Info, the firm's relational data base management system.

Info-Flow reportedly uses a series of menus to take users through the creation, generation and updating of documentation. The software includes cross-referencing and narrative reports on the system, data files, programs, reports and input forms.

Info-Flow is available on Prime Computer, Inc. systems and costs $5,000 from the vendor at 100 Fifth Ave., Waltham, Mass. 02154.

Software Standard Covers Documentation

ESTILL SPRINGS, Tenn. — A new software documentation standard said to provide a basis for lower software life-cycle costs has been introduced here by Associated Technology.

This standard covers all elements necessary for documentation of a detailed software design, according to the vendor. Included is information for documentation of structured program designs, data bases, external interfaces and quality-assurance provisions.

The standard is intended for software designers, documentarians, quality assurance, management, technical users and contract administrators. It costs $27.

Associated Technology is located at Rt. 2, Box 448, Estill Springs, Tenn. 37330.

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Spreadsheet Software Out For IBM Series/1 Users

SAN FRANCISCO — H&B Computer Systems, Inc. has introduced electronic spreadsheet software for IBM Series/1 users. Called Calc/1, it features a 254-row by 63-col worksheet designed for business managers without prior computer experience.

The software enables users to scroll up and down and side to side while maintaining column and row titles; vary width of each column individually; vary the width of each cell from 1 to 63 char.; move from cell to cell while highlighting specific cells; perform standard mathematical operations; enter dollar amounts and align decimals automatically; enter, edit and display both formulas and data; sort and load from a file; and print the screen on any printer on the Series/1, according to the vendor.

Calc/1 is available for $1,500 from H&B Computer Systems, Suite 204, 30 Hotaling Place, San Francisco, Calif. 94111.

JEM Tools Fit IBM's EDX

HERNDON, Va. — A Program Development Environment (PDE) package designed to encourage the use of modular programming techniques and linked subroutines in the IBM Series/1 EDX operating system environment has been announced by JEM Associates, Inc.

The program development tools reportedly provide automatic generation of the required $EDXLINK or $Link control data sets. They also provide maintenance of Autocall libraries, including automatic allocation and truncation of the object data set and update of the $Auto data set.

PDE is said to be fully integrated into the EDX session manager. A one-time license fee costs $750 from the firm at 459 Carlisle Drive, Herndon, Va. 22070.

Package Directs Goods Shipment

WALTHAM, Mass. — Shycon Associates, Inc. has announced Logistek-Europe, a package that can be used to facilitate shipping goods through Europe.

Said to run on any processor using a Cobol or Fortran compiler, the package incorporates information about European Common Market agreements that increase free trade across country borders. Items addressed include transportation, warehousing and inventory costs, currency exchange rates, raw material imports, transfer pricing, taxes and other inputs, the vendor said.

Packages cost between $30,000 and $300,000 depending on the level of sophistication. Most packages are customized, a spokesman noted.

Shycon is located at 1 University Office Park, Waltham, Mass. 02154.

Realtor Tracking Aid Runs on Wang Minis

CHICAGO — A real estate investment performance tracking tool that runs on the Wang Laboratories, Inc. 2200 series minicomputer is available from Shlaes & Young Information Systems, Inc.

The Comprehensive Real Estate Asset Management System was designed for commercial banks, life and casualty insurance companies, real estate firms and trustees of large real estate investment portfolios, the vendor said.

The software costs $48,000. Lease terms are available, Shlaes & Young said from 405 N. Wabash Ave., Chicago, Ill. 60611.

'Mastercalc' Fits Point 4's Iris

LOVELAND, Colo. — A spreadsheet program running under Point 4 Data Corp.'s Iris operating system has been announced by Computer Time Share.

Mastercalc runs on any Data General Corp. Nova-type computer using the Iris operating system with 64K bytes of memory.

The user-friendly Mastercalc features split-screen capabilities, trigonometric functions and formatting of output for both screen displays and hard-copy printouts.

Mastercalc is priced from $700.

Point 4 Data Corp. is headquartered at 1531 N. Lincoln Ave., Loveland, Colo. 80537.

Burroughs Users Get 'Tabucomp'

DENVER — A package said to provide electronic spreadsheet capabilities to users of large Burroughs Corp. computer systems has been introduced here by DSI, Inc.

System/Tabucomp reportedly offers display and printing in three different formats (floating point, financial and rounded integer); three table entry types; and a variety of statistical functions. It features 78 col by 299 rows, with computation capabilities of normal accounting statistics and linear regression that can be used in forecasting, the vendor said.

System/Tabucomp costs $8,000, a spokesman for DSI said from the firm at 2480 W. Alameda, Denver, Colo. 80223.

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Application Manager Out For Use With HP 3000

TULSA, Okla. — An application management system for use on Hewlett-Packard Co. 3000 series computer using HP's Cobol II and V/Plus subsystems has been announced here by Ergonomics, Inc.

The Application Management System 3000 (AMS3000) uses definitions stored in a small HP Image data base to replace the code for such functions as screen processing, function key processing, customized user menus, security constraints, opening and closing of all files and the logic flow with specific application routines, according to the vendor.

Also included in the system is a structured source code and a Copylib to facilitate the coding of the various application subprograms called by the AMS3000.

AMS3000 costs $8,500. Ergonomics is located at Suite 600, 5215 E. 71 St., Tulsa, Okla. 74126.

Cobol-74 Compiler Version Out For Use in Unix Environment

NEW YORK — Advanced Computer Techniques Corp. (ACT) has announced a version of its Full Ansi Cobol-74 Compiler for use in the Bell Laboratories Unix environment.

The initial Unix version targets the Motorola, Inc. 68000 instruction set, and the compiler has been fully implemented in the Pascal language, according to the vendor. The product features Ansi Standard X3.23-1974, and the nucleus and 10 function modules reportedly conform to the Level 2 standard.

The modules include table handling, sequential I/O, relative I/O, indexed I/O, sort/merge, segmentation, library, debug and interprogram communications. It also has a multipass design structure and object code generation for commonly used Cobol statements.

The compiler is priced at $230,000. Further details are available from ACT at 437 Madison Ave., New York, N.Y. 10022.

'MFG/1000' Runs on HP 1000

SAN JOSE, Calif. — Trans Micro Systems, Inc. has announced three packages for users of Hewlett-Packard Co. HP 1000 processors in manufacturing applications.

MFG/1000 is a complete manufacturing management package designed to optimize inventory investment, improve productivity and cut operating expenses. The package uses HP's Image data base and is geared to the nontechnical user, the vendor claimed.

MFG/1000 features five interactive modules: inventory control, bill of materials, work-in-progress, purchasing and material requirements planning. The package costs $35,000, the vendor said.

MFG/Plus is a financial package that also uses the Image data base. The package includes accounts receivable, accounts payable, order entry, inventory control, general ledger and payroll. The package costs $15,000, the vendor said.

Ask/1000 is a query language for data base report generation. It costs $6,000, the vendor said from 2233 Bailey Ave., San Jose, Calif. 95128

Package Puts SSP, OCL on Menu

TOMS RIVER, N.J. — Sys/34 Associates has announced a menu-driven programmer Productivity Aids package for IBM System/34 processors. The package reportedly takes commonly called system support program (SSP) and operator control language (OCL) and places them on a free-form menu.

In addition, the package contains operational aids such as file handling, documentation, programming and debugging to help improve user productivity, the vendor said.

The documentation module features a full cross-reference listing of libraries showing the correlation and interrelation of all programs, procedures and data files, the vendor said.

The debugging module features a display method that allows the user to display files by relative record numbers or record keys, the vendor said.

The package costs $150 including programs, procedures and documentation, with a money-back guarantee. Sys/34 Associates can be reached through P.O. Box 2134, Toms River, N.J. 08753.

'Scred' Update Offers WP, On-Line Tutorial

NEW YORK — Relational Data Systems (RDS) has introduced Release 2.10 of its Scred software for Data General Corp. computers. The updated Scred reportedly offers new word processing features and a complete on-line tutorial.

Scred is a screen-oriented text editor that runs on all DG operating systems, the vendor said.

Scred for DG Rdos, DOS and Icos operating systems costs $950. The AOS and AOS/VS versions are priced at $1,200 each.

RDS is located at 205 E. 42nd St., New York, N.Y. 10017.

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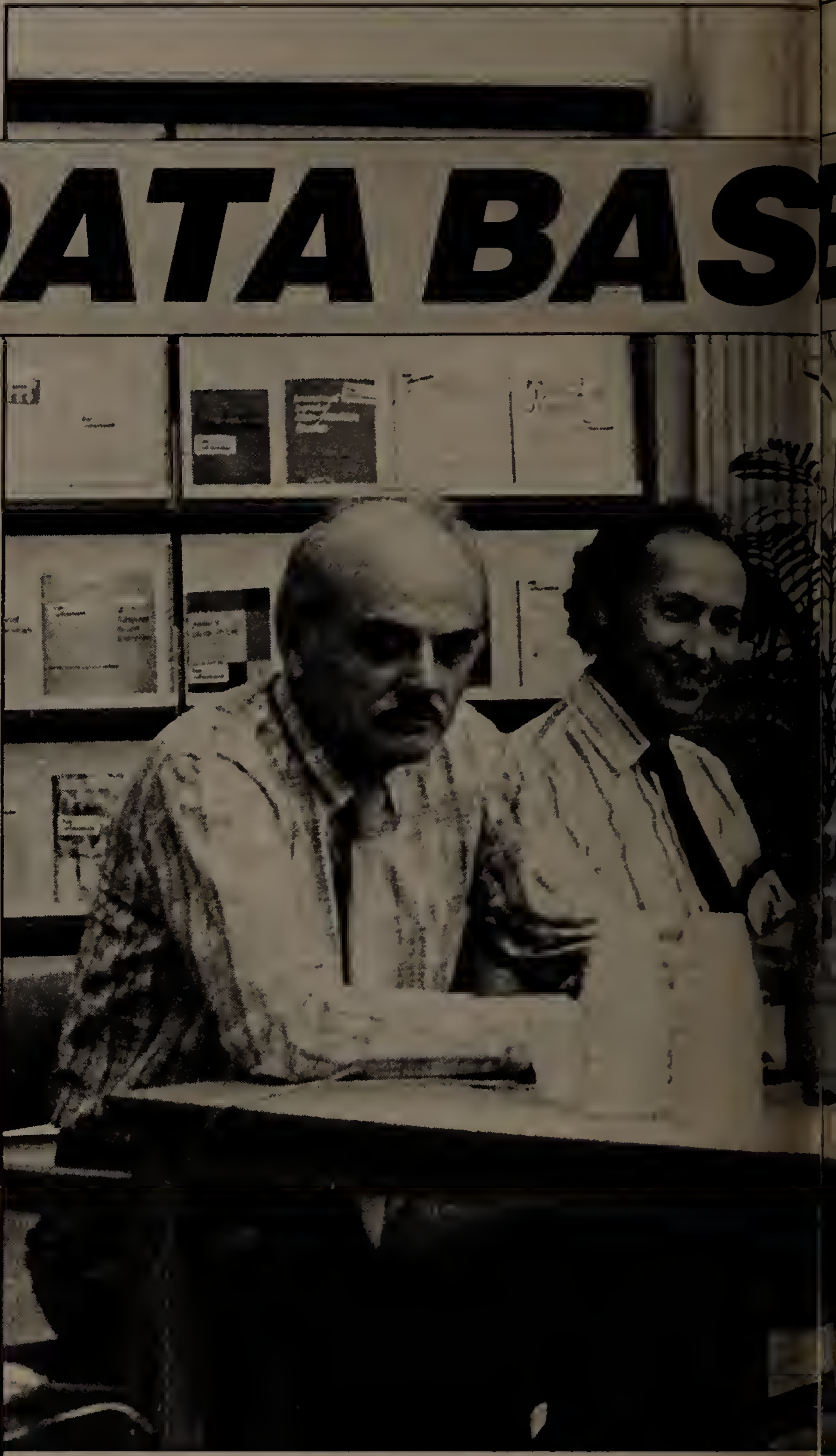
THE DATA BAS

Relational or Codasyl? That was the central issue of a lively debate among top authorities in the data base field, held recently at the Wang Institute of Graduate Studies, Tyngsboro, Mass.

Dr. Eugene Wong moderated the meeting of the minds: Dr. Edgar F. Codd and C.J. Date represented the relational side, while Charles Bachman and Frank Manola took the Codasyl side. Questions from the audience were also considered. An abridged version of the debate follows.

More information on the differences between the relational and Codasyl data base approaches is provided on In Depth/5.



Edgar F. (Ted) Codd is the originator of the relational model for data bases. His relational algebra, relational calculus and normalization of relations have had a profound impact on the data base management field. The author of *Cellular Automata*, Codd has worked on the logical design of computers (IBM 701 and Stretch), one of the first operating systems with a general multiprogramming capability and a subsystem to analyze and synthesize English for nontechnical users of relational data bases. He holds an M.A. and B.A. in mathematics from Oxford University, England, and an M.Sc. and Ph.D. in computer and communications science from the University of Michigan. A Fellow of IBM and of the British Computer Society, Codd was the 1981 winner of ACM's Alan M. Turing Award for his work on data base theory. He is currently engaged in research at the IBM Research Laboratory, San Jose, Calif.

C.J. (Chris) Date is with IBM in Santa Teresa, Calif. He has been active in the field of data bases, and especially relational data bases, for more than 10 years. The author of *Ar Introduction to Database Systems*, Date was responsible for the design of Unified Database Language (UDL), a proposed data base programming language. After working as a programmer and programming instructor with Leo Computers Ltd., London, Date joined IBM in 1967 as an instructor to help develop and teach a comprehensive training program in computer system fundamentals, IBM 360 assembler language and PL/I. He helped establish the IBM European Laboratories Integrated Professional Training Program, a cooperative education plan in which he developed and taught a course on relational data base. Date holds a degree in mathematics from Cambridge University, England.

WONG: Why is it taking so long for relational data base systems to gain market acceptance?

CODD: The question presumes that they have not gained market acceptance. Now, where they exist as products they are doing very well. [IBM's] SQL/Data System is now generally available and is doing exceedingly well. The feedback from SQL installations is very very positive. People are citing productivity increases of anything from five to 20 times what they had in previous systems.

So the delay is more one of getting products out, and this has been due to a great many factors, some of which I will not go into now. *(laughter)*

DATE: Clearly, some technical invention was required to get to the product stage from the original definition of the model in 1969, 1970. With regard to performance, it's essential to have a compiling approach — the ability to recompile automatically when things change in the overall system. Until that work was done in System R, although perhaps in principle some of us could see how it could be done, it had *not* been done. People were therefore still somewhat skeptical. Now that it has been done, we're beginning to see that things can really be made to work well.

BACHMAN: Not having been involved in the development of relational systems, I don't know why it's taking so long!

MANOLA: I have a question to ask in response to the question. If there was a 20 times productivity increase over exist-

E DEBATE!

CW Photo by C. Marenghi

Charles Bachman is vice-president of Cullinane Database Systems, Inc. in Westwood, Mass., where he is involved in the conceptualization and design of new information processing products. Bachman invented the network or Codasyl model for data base systems while at General Electric Co. and published his work in 1964. In 1966, he was a founding member of the Codasyl Data Base Task Group. He worked with Honeywell, Inc. from 1970 to 1981 and then assumed his present position at Cullinane. Winner of ACM's Alan M. Turing Award in 1973, Bachman is chairman of the International Standards Organization's committee on Open Systems Interconnection. He received a B.S. in mechanical engineering from Michigan State University and an M.S. in mechanical engineering from the University of Pennsylvania. In 1977, he was named a Distinguished Fellow of the British Computer Society.

Frank Manola is senior computer scientist at Computer Corp. of America's Research and Systems Division, Cambridge, Mass. He is currently managing the development of a high-level query language called CQLF (Codasyl Query Language, Flat) for Codasyl-type data base management systems (DBMS) and a component architecture for DBMS. The project, sponsored by the National Bureau of Standards, is currently engaged in the formal definition of the relational, network and tree data models and the development of data base language user interfaces based on those models. Manola was a member of the Codasyl Data Description Committee for nine years and is now a member of the Ansi X3H2 committee. He holds a B.S. in civil engineering from Duke University and an M.A. in computer science from the University of Pennsylvania.

Eugene (Gene) Wong is professor of electrical engineering and computer sciences at the University of California, Berkeley, where he has taught since 1962. His current research interests include many aspects of data base management systems, with special emphasis on query processing, logical design and schema conversion. He was a cofounder of Relational Technology, Inc. and a codesigner of that firm's Ingres relational DBMS. He has published extensively on DBMS and on systems theory and has been named to various fellowships, including National Science Foundation Post-Doctoral Fellow to Cambridge University, England, a John S. Guggenheim Fellow, and a Harvard University Hayes Fellow. A fellow of IEEE and a member of ACM, Wong holds a B.A. and Ph.D. from Princeton University.

ing systems cited, perhaps we should know whether the existing systems were IMS installations . . .

CODD: It's fortunate that I do not have the specific data . . . *(laughter)*

WONG: My next question, for Charlie Bachman: You've been prominently associated with various standardization efforts, in particular, the attempt to standardize Codasyl systems. Isn't standardization based on past rather than present or future concepts? And in a fast-changing technology, doesn't that imply that you're casting in concrete things which may already be obsolete?

BACHMAN: It's an interesting question, and I think it's one that should be answered as clearly as possible.

Standardization is a mechanism by which some organization tries to arrive at a consensus about what is a good set of facilities that does something, whether it's screw-on bolts or standard colors of paint, or standard ways to distinguish the men's room from the women's room. Now, if they were an end in themselves, then they would have certain value. But typically, the standard is a foundation from which you make the next step forward. In the absence of that set of standards, you must end up stuck on this level where you cannot go forward.

Standards, in one sense, freeze one level of development while making available the next level of development. So standards are a mixed blessing. You lose certain flexibility, but you gain a firm foundation from which you can jump higher.

CODD: I would say that in certain fields, adoption of standards has enabled one to go forward and think of higher level things, like adopting a standard size for a screw in some machinery has enabled you to forget about whether to use a different size screw — say, a nonmetric screw — and consider more interesting problems.

But in software, I don't see standards as providing this platform for future development. I see *research* as providing the platform — and I mean *continued* research — being dissatisfied with what you've done. And standards are not that. Standards are being satisfied with what you've done.

BACHMAN: I think, though, we must distinguish whether we're trying to do academic research or trying to get on with putting better production control systems into existence, better payroll systems, better airline reservation systems. If one looks at either the network model or the relational model, both are ancient by the point of view of computer systems.

Now, Ted's work was published in 1969, I believe, in ACM; my work was published in '64 at the Fall Joint Computer Conference. I think they're five years apart. And neither one of those has really hampered anybody from doing some useful work. Now, *one* of them may have *helped* people do a lot of useful work.

CODD: May I say, speak for yourself?

BACHMAN: I *wasn't* speaking for you, Ted! *(laughter)*

MANOLA: I think that the wrong villains are being placed on the opposite ends of this spectrum. I think that there's a lot of confusion when data base standards are discussed. And people don't define their terms.

A key issue, for example, is, are you talking about *one* data base standard or *many* data base standards? When people talk about standardization of Codasyl, sometimes what they're really objecting to is the establishment of *one* data base standard, not the establishment of a standard for Codasyl systems that says, "All Codasyl systems shall look like this."

CODD: The attitude of the Codasyl group when I first encountered it was, "We're going to pull off another Cobol! And be *the* dominant language, as far as data base is concerned." So there was good reason for fearing that standard activity. Now I must say, the same kind of dominance by dictum was the aim of some of the PL/I developers. So

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don't feel I'm just criticizing people outside of IBM.

MANOLA: And PL/I was created after Cobol, so the existence of Cobol didn't stifle *that* development!

CODD: There was a considerable number of people who thought that PL/I was going to be *the* one universal programming language.

MANOLA: Can I finish up? As far as the ability of the standard to enable further progress to be made, if you standardize something that's flat and can be easily built upon, it's great. When you standardize something that's uneven, you're going to construct some funny-looking thing. So there is no question about the fact that the content of the standard is important.

But one of the things that standards are for is to allow the users to have something to say in how the thing develops, as opposed to allowing the vendors and people who are able to twiddle with the language definition to decide by themselves how the thing's going to evolve.

BACHMAN: A point to make, to fol-

Codasyl vs. Relational: In a Nutshell

The Conference on Data Systems Languages (Codasyl) data base approach is based on a two-level set or tree structure, with the programmer navigating through the data base. Also called the network model, the Codasyl model has the ability to declare and manipulate owner-member set relationships, which are structured to represent one-to-many relationships among the application world entities that they represent.

The Codasyl committee adopted a data base standard called Network Model 1, which has been incorporated into several commercial offerings. These include IDMS (Cullinane Database Systems, Inc.), IDS and IDS II (Honeywell, Inc.), Seed (International Data Base Systems, Inc.) and DBMS-10 and -20 (Digital Equipment Corp.), according to Frank Manola.

The prototype for the Codasyl model was the Integrated Data Store (IDS) product, which Bachman developed at General Electric. Bachman is also responsible for Cullinane's data base product IDMS. Network Model 2, recently completed, has not yet been implemented commercially.

The relational model is characterized by flat files or tables called relations, organized into a homogeneous set of records called tuples (rows) and domains (columns).

Unlike the Codasyl model, the relational model is designed to support automatic navigation to the target data. There are no user-visible navigation links between tables, which is said to ease data access by nonprogrammers. Each relational record within a relational file must be unique and must not represent more than one application world entity.

The prototype for the relational model was System R, developed by Codd at IBM's San Jose Research Laboratory. In January 1981, IBM announced its first fully supported relational product, SQL/Data System (SQL, pronounced "sequel," stands for Structured Query Language). In 1979, Codd published his work on the relational model RM/T, which extends the semantics of the basic relational model.

Descriptions of 70 commercially available relational or relational-like systems were submitted to the Ansi Relational Task Group, which was set up to explore the feasibility of a relational data base standard. The group's final report is now available. Codd reports that all U.S. hardware vendors have relational systems under development.

Some representative relational products, besides SQL/DS, are IDM 500 (Britton-Lee, Inc.), MRDS/Linus (Honeywell, Inc.), Nomad (National CSS), Oracle (Relational Software, Inc.), Ingres (Relational Technology, Inc.) and Encompass (Tandem Computers, Inc.), according to Codd.

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low in that direction: The need for standards will become much more obvious when we are trying to operate across multiple computer types — if someone tells me, "I can't live with just Manufacture A or Manufacture B of these computers." The need for a homogeneous protocol for remote data access and update will in fact force the development of homogeneous data management systems.

CODD: The French have recognized this for some time. With regard to their population statistical data bases, they have data bases for the citizens who lived in all the various regions of France, and they had, as of the early '70s, different data base management systems in the different regions. They then discovered that they wanted to do transactions on the totality of data, and they had no standard at that time. They looked into the relational model, adopted it and implemented a system that gives you a relational view of the totality of the data.

BACHMAN: In the last few years I have been very active in the International Standards Organization's work on Open Systems Interconnection. One of the critical aspects of compatibility is not compatibility at compile times, but rather compatibility of the microsecond level. Either a computer talks the same protocol that your computer does, or it doesn't. If it doesn't, you're all done.

One of the things you want to be able to do is to get from an arbitrary computer A to an arbitrary data base Z with a protocol-defined request. There had better be some standards on how you express that requirement of the destination data base or you're just out of business.

We've had a lot of struggling about data base standards and a lot of opposition to them. But if you want to distribute data base access, you'd better face up to the need for standards, or the system won't understand what you're saying to it.

FLOOR: According to Dr. Codd, the added benefit of the relational model is that it's distributable. Now Mr. Bachman has just mentioned distributed transaction processing. What does the network model have to that effect?

BACHMAN: When you're distributing parts of the data base, you're also distributing the declarations that go along with that. And once you set up the mechanisms to understand semantics of the language, it doesn't really matter what data model you pick as long as all the processing elements understand. You can do it at the network level, in terms of a network data base; you can do it with the relational data base.

CODD: I would like to add, there is much more freedom in decomposing a relational data base for distribution.

By contrast, with a Codasyl network data base, the structural links reduce the freedom of slicing tables into portions to be distributed to different nodes of a computer network.

I think Charlie's answer assumed that when you were going to parcel out a Codasyl data base from one place to perhaps several other places, you took certain of the declarations and moved them to, say, Node A, certain other declarations to Node B, other declarations to Node C . . .

BACHMAN: No.

CODD: No?

BACHMAN: No.

CODD: Well, how is this distribution occurring?

BACHMAN: Let me give you one possible model. Today all of the Codasyl, or network, systems are inherently paging systems, virtual memory systems, which unfortunately don't cooperate very well with the program virtual memories. But at the present time, to access a record, the data base system says, "Oh, you want this page, and it's on that disk. I'll bring the page from the disk into my computer."

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computer, but on these thousand disk drives or 10,000 disk drives at different computers. Then when I ask for a page that's not on my machine, the system finds out what machine it's on. And that page will be brought to me, just as if it had come off my local disk. In this sense, any system accessing data has exactly the same set of declarations, and distributed access is controlled at the physical level. Each system knows where every page is stored.

FLOOR: Are you saying, then, that the network model, where you begin to distribute it, looks like the physical model, whereas, as Dr. Codd has stated, the distribution of the model is at the logical level?

BACHMAN: It's possible to distribute at three different levels. The example I've given you is distributing at the physical storage level. Say a set of banking records for the San Francisco office are in the San Francisco computer, and the banking records for the Los Angeles office are in the Los Angeles computer. You can also distribute at the logical level. In fact, you can do distribution at several different levels, each one of which is optimal under certain circumstances.

We're getting into the packaging details, and we can't get very far in terms of where each one works best. But there are several different implementations, all of which are practical and doable.

CODD: However, the Codasyl model has a problem if you do the kind of distribution where you say the San Francisco records are going to be over there and, say, the New York records are going to be over here. And you want a Codasyl set that spans the lot.

BACHMAN: Why is that a problem, Ted?

CODD: Because the thing is, while you might want to have an overall logical schema that covers the totality of data for the whole network, you probably also want local schemas that are known to be local. OK? It seems to me that one should start with the problem of planning how to distribute a given *data base description.* With the Codasyl model, you have the serious problem of carving up the owner-member links. No such problem occurs with the relational model.

MANOLA: It seems to me that there are a number of unstated assumptions affecting the various sides of this discussion. I wouldn't contemplate a very effective distributed Codasyl system unless it had, first, high-level operations; second, contemplated implementation techniques for the sets other than lists. I think under those assumptions it becomes no more or less difficult to distribute a Codasyl system than a relational one.

CODD: OK, so you're talking about Network Model 2 . . .

MANOLA: Yes.

CODD: . . . I agree, when you get to Network Model 2, you've certainly got more distributability. You can manage the thing better than in the Model 1.

However, we've yet to see a Net-

Point-Counterpoint On Standards

WONG: Isn't standardization based on past rather than present or future concepts? And in a fast-changing technology, doesn't that imply that you're casting in concrete things which may already be obsolete?

BACHMAN: Standardization is a mechanism by which some organization tries to arrive at a consensus about what is a good set of facilities. If standards were an end in themselves, then they would have certain value. But typically the standard is a foundation from which you make the next step forward. In the absence of that set of standards, you must end up stuck on this level where you cannot go forward.

Standards, in one sense, freeze one level of development while making available the next level of development. So standards are a mixed blessing. You lose certain flexibility, but you gain a firm foundation from which you can jump higher.

CODD: I would say that in certain fields, adoption of standards has enabled one to go forward and think of higher level things . . . But in software, I don't see standards as providing this platform for future development. I see *research* as providing the platform — and I mean *continued* research. Being dissatisfied with what you've done. And standards are not that. Standards are being satisfied with what you've done.

BACHMAN: I think, though, we must distinguish whether we're trying to do academic research or trying to get on with putting better production control systems into existence, better payroll systems, better airline reservation systems. If one looks at either the network model or the relational model, both are ancient by the point of view of computer systems . . . And neither one of those has really hampered anybody from doing some useful work. Now, *one* of them may have *helped* people do a lot of useful work.

MANOLA: I think that the wrong villains are being placed on the opposite ends of this spectrum. A key issue, for example, is, are you talking about *one* data base standard? Or *many* data base standards? When people talk about standardization of Codasyl, sometimes what they're really objecting to is the establishment of *one* data base standard, not the establishment of a standard for Codasyl systems which says, "All Codasyl systems shall look like this."

CODD: The attitude of the Codasyl group when I first encountered it was, "We're going to pull off another Cobol! And be *the* dominant language, as far as data base is concerned." So there was good reason for fearing that standard activity. Now I must say, the same kind of dominance by dictum was the aim of some of the PL/I developers. So don't feel I'm just criticizing people outside of IBM.

MANOLA: And PL/I was created after Cobol, so the existence of Cobol didn't stifle *that* development . . .

But one of the things that standards are for is to allow the users to have something to say in how the thing develops, as opposed to allowing the vendors and people who are able to twiddle with the language definition to decide by themselves how the thing's going to evolve.

BACHMAN: The need for standards will become much more obvious when we are trying to operate across multiple computer types. The need for a homogeneous protocol for remote data access and update will in fact force the development of homogeneous data management systems.

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work Model 2 implementation.

BACHMAN: I think you're stretching too hard, Ted. I think that you're using Network Model 2 to mean a little more than it is and to demean Network Model 1.

CODD: No, I don't think I'm putting down Network Model 1. Network Model 1 was certainly a contribution.

BACHMAN: I'm glad it was.

CODD: . . . The point is, what Frank talked about this morning is certainly an enrichment by a considerable factor of Network Model 1. High-level operators that, so far as I know, have not yet been implemented in any system. Now, what I would contend is that the enrichment is going to cause a lot of implementation problems over and above your relational model. For example, optimization — when you're considering how to decode a transaction that entails getting some data from Node A, some data from Node B and so forth, and putting them together.

The kind of optimization needed is going to be far more complicated in Network Model 2 than in the relational system. And we have, I think, in a few places, some experience in that kind of optimization.

FLOOR: What exactly are the variables you're trying to optimize — performance?

CODD: Well, a lot of the goals are in economizing on communication costs. You'd like to, for example, not send data from a node — let's say, San Francisco — 'to New York to form a join and then send the join back to San Francisco, if instead you could form what's called a semijoin in New York and ship that to San Francisco. In other words, you'd like to decompose your query into fragments that can be executed in the remote places and thereby minimize the amount of communication data that's communicated across the lines. That is the significant objective.

MANOLA: I look forward to finding out what some of these additional complexities are, because while I'm prepared to be convinced to the contrary, I suspect that the additional complexities of distributing a Network Model 2 system will not be that much greater than a relational system. If only because I imagine a fairly straightforward relational representation of the set constructs such that all of the existing optimization methods that have been derived under relational concepts would continue to work.

BACHMAN: I think that in the distributed data base problem, we have to maintain both the update capability as well as the retrieval capability. And it's not clear from anything we've said so far that we've made the case for either side.

WONG: My next question relates to the extended relational model RM/T, and I would like to direct it to Chris Date. It seems to me that by making the relational model, whose primary advantage is overall simplicity, more complex to expand its semantics, you are making something that's streamlined baroque. Why not just admit it, that the relational model is not good in dealing with semantics, is not good in thinking about data as opposed to manipulating data, and say, "Let's choose an entity-relationship model as an alternative for these purposes"?

DATE: I hope you're not trying to be provocative, Gene!

That's the sort of question that requires quite a lengthy answer, I think. In our RM/T work, we were adding only things that *essentially needed* to be added to the model to support new kinds of constructs like associations, designations and so on.

Now to some extent, of course, it's true. You're complicating the model by adding these additional semantics. But the thing I must emphasize is that this applies mainly at the data base design level. The external users of it, the application programmer or end user sitting at a terminal, still would usually see the same kind of structures that they would see under the normal basic relational model today. Most of the complexities are in the design level and in the mapping

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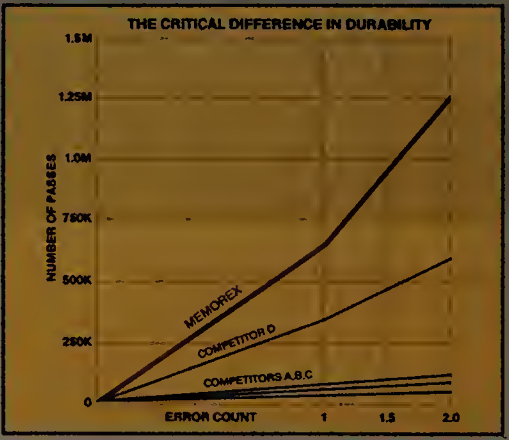
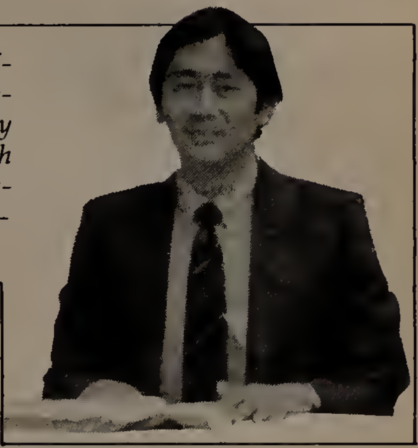


between the design level (the RM/T level) and the external level.

Furthermore, a lot of the complexity, I think, is in the *description* of what's going on. It all sounds complicated because we have to use all this new terminology all the time. But I sincerely believe that if you go away and think quietly about it and try to understand it, it is *not* difficult. It just sounds difficult because there's so much it's overwhelming.

> ***WONG:** It seems to me that by making the relational model, whose primary advantage is overall simplicity, more complex to expand its semantics, you are making something that's streamlined baroque. Why not just admit it, that the relational model is not good in dealing with semantics, is not good in thinking about data as opposed to manipulating data, and say, "Let's choose an entity-relationship model as an alternative for these purposes"?*



WONG: Some of the semantic constructs that you introduce have been introduced in models before. Why proliferate terminology?

DATE: That's a bad thing to do, I agree. And it's true, quite possibly things like associations, designations and so on have been introduced in other models before.

I don't think it's so much a question of proliferation, however. It's just trying to choose a set of terminology that does not conflict with the basic terminology in the basic model we're trying to build on. So that rules out, for example, words like "attribute," because they already have other meanings, and yes, what I call attributes someone else may call properties. That's somewhat unavoidable. But I should tell you briefly, there have been many influences on this RM/T work, as Ted acknowledges in his 1979 RM/T paper, and these different influences do not all use a consistent set of terminology.

FLOOR: In your initial answer to the question, you seem to distinguish between the data base designer, the application programmer and the end user. Would you agree to that distinction?

DATE: The distinction I made was between the data base designer on the one hand and the user — be it the application programmer or the end user at the terminal — on the other. These last two kinds of users don't become involved in the complexities of RM/T that we were talking about.

FLOOR: That's where I would naturally disagree.

Surely, what we're all aiming at is that the end user become all three. Maybe not right now, but the ultimate intention is that the end user should be capable of doing all three, acting all three roles.

DATE: I would agree that in certain kinds of installations, it is desirable for the same person to perform all three functions, and certainly I would like to rule out any arbitrary differences between those three roles. But I think that there's no question that in many installations, it's always going to be the case where you have to have an expert who does the data base design, and many many more users who are only interested in the data base for what they can get out of it.

CODD: And where there is one person performing all three roles, generally speaking the data base will be of simpler construction. In other words, you get this specialization of roles where you've got a very rich and probably very large data base to deal with.

FLOOR: I imagine that would be the exception rather than the rule. There are a lot of data bases out there that haven't come into being because we haven't had the facilities for putting them into place.

DATE: I would agree with you, there are types of applications that we have not been able to realize in the past.

But I would also point out that something like RM/T is clearly subsettable. If, as Ted suggested a moment ago, those data bases are rather simpler in structure, quite a lot of that stuff simply may not apply, and we wouldn't have to worry about it.

WONG: A brief comment from Charlie Bachman?

BACHMAN: It seems to me, one can interpret the RM/T extension to the relational model in two ways: One is that it is trying to extend the relational model; the other is that it is trying to describe the network model using relational terms. *(Codd shakes his head in disagreement.)*

They were trying to handle situations that were not adequately handled in the initial relational product definition — situations which many think are very important in terms of doing real data bases. So I am delighted to see the progress they're making. *(laughter)*

DATE: *(throwing up his hands)* Can

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DATE: I think there are two kinds of complexity. One is inherent: You are inherently trying to do a more complicated job. And the other is unnecessary. My personal outlook on the whole data base field is that everything is so complicated anyway that anything we can do to simplify it, we ought to do.

you record hand gestures on the transcript?

FLOOR: Another point: I saw a brochure coming around for a data base system called Noah. And I found it strange — in this brochure, they actually suggest you use an entity-relationship model to design your data base. And then you reduce that into the relational form, because it has a relational interface, or language.

CODD: I would say that is not at all strange, bearing in mind the origin of the entity-relationship model, per Schmid, Swenson and Chen. Chen took the relational model and said, "We will divide relations up into two kinds, and they are disjoint: One kind is the entity-relation and the other kind is the relationship-relation." I think actually he made a mistake in making those classes disjoint. Because we definitely want sometimes to think of a relationship-relation as an entity.

FLOOR: I agree with that.

CODD: OK. Now, that simple change really retains the underlying model. In other words, Chen didn't invent new operators or, as far as I know, new integrity rules. He did invent a number of new diagrams, but those are, you might say, design aids. They're not things you necessarily embody when you come to interact with your data base as an end user. I don't see anything, in other words, strange about being advised to use the entity-relationship model as a design tool and having a relational data base as the end result.

FLOOR: What strikes me as strange is why we should have to go down one level. Why can't we stay at *a* level and say that is the level where we will think, work, act and do everything?

We just have this silly concept called the relation, which seems to be the root of all evil. It seems to divide the two communities, and I think that's unfortunate.

CODD: I think historically the division between the two camps was very much more marked than it is today. And largely because, in the relational camp, we wanted to have as few primitives as possible — structural primitives and operators. In the Codasyl approach — it wasn't a model when originally defined — language specifications were introduced, and there was no attempt to make the language minimal. For example, there are 15 different kinds of FIND!

Now if you look at the Codasyl specs today, you will *not* find 15 different kinds of FIND, and in fact, they've thrown out repeating groups. I think they *would never have thrown out repeating groups had it not been for the relational work!*

BACHMAN: With regard to repeating groups: One must understand that the Codasyl specifications are the result of a committee. And committees don't always build the most beautiful things. Sometimes they build very useful things, though. And I am going to be very interested to see what the relational specifications look like after a Codasyl committee or Ansi committee of 10 or 14 people has worked over the specifications.

I would like to refer back to the prototype for the Codasyl system, which was General Electric's Integrated Data Store (IDS) product. It had no repeating groups. Repeating groups seemed like an inappropriate thing. You see, the repeating group is just another set. It's a different implementation-type thing. And when the Cobol people got hold of it, they said, "We've had those things in the past, and we want to still have them."

CODD: OK, it did not have repeating groups, that's correct. But it did have owner-member sets.

BACHMAN: Oh, it still does. But the basic network model still has owner-member sets.

CODD: But what I'm saying is, why not go the step further and dispense with them, too? *(laughter)*

BACHMAN: I think the difference we're looking at is whether we're going to have two ways to do the same thing or one. The repeating group is a feature of hierarchical systems such

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as IMS which support a limited application of the owner-member group. The member can have one and only one owner. The essence of the network model broke through that physical constraint that came from magnetic tape systems, punchcard systems, and said, "Well, the member concept is only going to exist when you introduce a one-to-many relationship and each member can be in many such relationships, unconstrained by this physical phenomenon."

And so we didn't need two mechanisms — one which is physically limited, while the other had no logic limitations.

MANOLA: We have covered quite a wide stretch of territory here: semantic problems to repeating groups. It just seems to me that a lot of this discussion was about the differences between models, ignoring the differences in power which caused these models to be constructed in the first place.

It wasn't a choice between simplicity and complexity. It was a choice between adding some additional objects and perhaps operations which behaved in new ways, ways in which naturally occurring things like relationships and entities behaved; or defining some triggers or some related constraints which forced the relations to operate that way. There's additional complexity in either case.

Unless we get data base systems that can read our minds, there won't be any choice: If we want the system to do more for us, we'll have to tell it more.

DATE: Coming back to something that Frank just said, that there's additional complexity in either case:

Of course, that's true. But I think there are two kinds of additional complexity. One is inherent: You are inherently trying to do a more complicated job. And the other is unnecessary.

My personal outlook on the whole data base field is that everything is so complicated anyway that anything we can do to simplify it, we ought to do. If, to attack a new kind of problem, you introduce a new kind of object and new operators, that will be fine, if the new thing is necessary. If not, then unfortunately you introduce a lot more choice.

I don't mean to pick on Codasyl, but it's an obvious example: In Codasyl, because you have records and Codasyl sets, you always have some choices for a given piece of information in the world. Do I represent it in records or in sets? Often there is a real choice. And I don't really know how to answer that question. Once you've made a choice, you have all the operators that go along with it, all the error conditions and so on. So as far as possible, whenever we can steer away from adding unnecessary complexity, we will, and throw away things we don't need.

MANOLA: I think there is an underlying principle there which is more general, if the issue is simplicity in the objects you're looking at.

To represent some things in relations requires that the user do a relatively large number of operations in order to recover what is essentially one thing. Think of representing a geometric object described in terms of points, or think of describing the sentences and paragraphs of a message and representing that in terms of-relations. I see a number of papers — coming out of IBM research, in fact — which suggest that for many of these applications, some more complex object, at least in the user's view, is helpful in processing those objects because they have inherent complexity.

In other words, the combination of the complexity of the objects the user has to look at and the operations he has to learn in order to operate on these things should be taken into account. Yes, in a system that allows complex objects there will be more operations, because there are more different kinds of things. But you have to weigh that level of complexity with the level of complexity in manipulations the user might have to do with a system that allows only simpler objects and simpler operations.

CODD: There are applications that do require the manipulation of more

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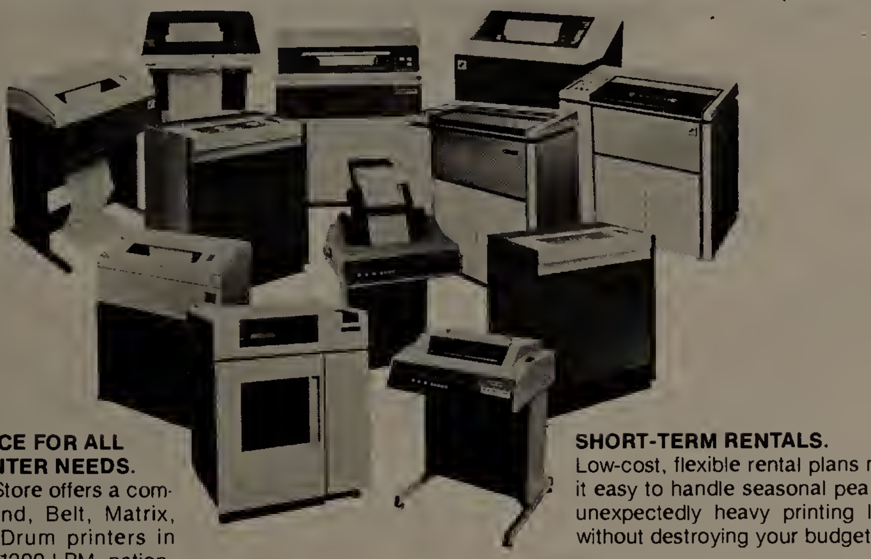

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complicated objects than relations. However, if you have a very large body of commercial applications that can get by with the relational structures and operations, then you should certainly implement the simplest machinery that can do that job first. *Then* work toward extending that machinery to do the more specialized applications, the more complicated ones.

That's the sequence we're taking. And in none of this business of extending the model to handle more complex objects or extending it to incorporate semantics are we going *backward* — in the Codasyl direction — by introducing navigation at a lower level!

BACHMAN: I'd like to introduce one thought here. If you look at all the examples in the SQL manual, one of the most interesting facts is that they suppress repeating groups in all printouts. So that if you're dealing with department and employee, be very careful that you suppress the repeating department code so you look at the employee number. In every example in the manual they print out, they convert data back into structured data from the flat relational model.

CODD: That is *presentation structure,* which should be distinguished very strongly from data base structure, just as input record structure should also be. Input schemas for your input structures should probably be different from your data base structures. By making the data base as simple as possible and as powerful as possible, you can factor out that input complexity from the data base manipulation and factor out the output complexity also. You have things called report generators for the latter.

BACHMAN: Let me tell you something. What Ted's saying is that you cannot think of information in a single way as in an input and processed local storage, and in the data base. Ted is saying you have to have different things for each purpose. I propose that one data model should be sufficient.

FLOOR: OK, I have an application to discuss: 75 different panels, screen panels. Do you envision an implementation that consists of 75 screen panels implemented one way?

BACHMAN: No. What I'm saying is that one data structure, one conceptual structure, should represent all the structure in all the screens as well as all the structure in the data base. They are just different representations of the same information. *(Codd shakes his head in disagreement.)*

We're distinguishing data from information. One set of information definitions, compatible with many data representations. Do we want to print the same information over and over again — is the customer name needed for each order? I say no, the customer only existed once in the first place, even if he had 14 orders. Flattening the file out may make a simple model for some people to do mathematical expressions on, but I don't think it helps anyone in planning or using a data base.

MANOLA: Can I pin down this argument Ted just used? I always thought that the major argument for the relational model was that the users found flat forms easier to deal with and manipulate and think about than data in other presentation forms. And what I thought I just heard you say was that the presentation can be hierarchical if some users find that easier to deal with, that is, the underlying engine that is simplified by treating data as relations.

CODD: Well, I think you have interpreted "engine" as being the physical data base engine. Obviously, in formulating queries and other transactions, people have to deal with a conceptual view of the data that's stored. And that's what I was really referring to when I talked about the data base engine — the logical data base engine. I wasn't referring to the physical manipulation, the physical structures.

What I'm saying is that in conceiving how to define a particular transaction — unless you're dealing with specialized applications that have

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pretty complicated objects, like the engineering drawings and so forth for a manufactured part — people generally find tabular structures and the simple slicing of a table, horizontally and vertically, and joining tables very easy to cope with as compared with hierarchical or network structures.

DATE: I'd like to add a little gloss to that. I'm not going to argue that A may be easier than B; you can never win that kind of argument. But you can point to something very concrete: the number of concepts you have to wrestle with; and that is in terms of the logical structure of the data base engine, the data constructs.

The number of data constructs, in turn, affects the number of operators that have to be supported. And when I say operators, I don't just mean the manipulative operators, I mean the definitional operators, authorization operators, integrity operators and so on. There are repercussions throughout the data model. The fewer the data constructs, the fewer the operators. Error messages are another example. And that's something concrete.

BACHMAN: The question of simplification of the data model has certain attractiveness. I wonder, though, if anyone ever thought there might be a level where people start thinking about data.

We talk about concepts such as computer literacy. And I am wondering if the literacy of the computer world is going to walk away from the level of requirements that Ted and Chris are proposing. People are quite capable of learning new, useful concepts and they can deal with the world that has dimensions, values and relations.

Have we exceeded the mental capability of the computer-literate audience we're going to have and which is coming very quickly out of our high schools? I think the answer is no. I think that people will make that little step extra, learn one more concept and find they have far more powerful tools to work with than the relational systems offer and be more comfortable with them.

CODD: On this question of computer literacy, it is certainly possible for a person to be literate in the sense of understanding every structural concept in — and I'll take an IBM system — MVS, and *not understand the system as a whole* because it's just too big a ball of wax. There are so many instances of Concept A, so many instances of Concept B and so on working in a very intricate way together, that no matter how computer literate you are, unless you spend day after day with such a system, you are unlikely to understand it in a full way.

BACHMAN: I think the example of MVS is very interesting. I would certainly rather learn it if it were described in terms of entities, attributes and relationships, than just entities and values.

CODD: By the way, I chose MVS not in the belief that MVS is unique. *(laughter)*

BACHMAN: I was hoping it was!

WONG: Suppose someone is a current Codasyl user, say, a user of IDMS, working with a procedural language, and he wants to move in the direction of a high-level compatible query language. But he has a problem: he has a large body of application programs written in the existing procedural DML (Data Manipulation Language).

Let me ask Frank Manola: What migration path would you offer him, to move him in the direction of converting his existing applications to one which is suited to nonprocedural language?

MANOLA: Well, first of all, I would make the observation that as long as the applications continue to work, I wouldn't touch them with a 10-foot pole! The advantage of something that works over something that may not is so obvious that I wonder why anyone would contemplate changing them.

I think there would certainly be strong motivation for going to that kind of access, just as there would be in the relational case. As with SQL,

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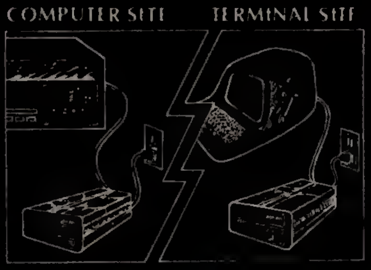

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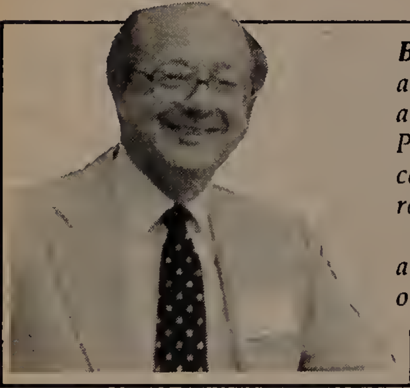

BACHMAN: We talk about concepts such as computer literacy. And I am wondering if the literacy of the computer world is going to walk away from the level of requirements that Ted and Chris are proposing. People are quite capable of learning new concepts which are useful concepts, and they can deal with the world that has dimensions, values and relations.

Have we exceeded the mental capability of the computer-literate audience we're going to have and which is coming very quickly out of our high schools? I think the answer is no.

CQLF was designed for embedding in programming languages so that programmers could have set-at-a-time access to their data.

In terms of trying to convert from existing programs to a program, say, with embedded CQLF in it, I would say that about the best you could do is use heuristics — I know of some work going on which is an attempt to do automatic conversion. One looks for the places where people have formed sets of records and tries to find the queries that duplicate the formation.

But I'm really not sure how often there would be an incentive for someone to take an existing application and convert it without there being some enhanced functionality associated with the application that would make rewriting it desirable.

WONG: Charlie, what are your thoughts on the subject of procedural vs. nonprocedural language, and particularly for the existing Codasyl systems?

BACHMAN: Well, I think I interpreted your original question the same way Frank did. That, given a network-type data base which has a procedural language, it's very appropriate that it also have a nonprocedural query language. In fact, I think most of them do. It's also appropriate to have a nonprocedural report-generation language, and most do.

I think that what Frank demonstrated in his work on Network Model 2 was a very interesting example of how you can do query languages against network data base systems. Frank proved the point that you don't have to be procedural to deal with a structured data base. You can have nonprocedural aspects, too.

WONG: The point that Ted Codd raised earlier about productivity is tied not only to data models, but more and more to the level of the language that is used to program the applications. Would you agree that in Codasyl systems, the nonprocedural languages could improve productivity?

BACHMAN: I think that nonprocedural languages, first of all, are not nonprocedural. They're languages which have some very high-level functionalities that you can call out. It may simply be RUN REPORT. That's a nonprocedural language. But it's understood very clearly, when a person says RUN REPORT, and the thing runs the report, what it means.

The query situation is a very well-understood operation that can be expressed in terms of one thing after another. To the extent that you can write a complete problem description without some sequential code, I'm all for it.

MANOLA: I think I would like to take a different point of view. I happen to think that the ability to have these set-at-a-time operations available is critical, and that the class of data base structures which these operations access should be as general as possible and that that nonprocedural language should be accessible from within programs.

I would suggest that if you are a data base user and/or know some, and if you find that higher level data base languages would be advantageous to productivity, you should write your vendors and insist that they provide them.

FLOOR: How far does one go with this higher level thing? I mean, high-level to one person is lower level to someone else. If someone has to sit in front of a terminal and they want to deal with something related to a purchase order, they want to see a purchase order on the screen. To

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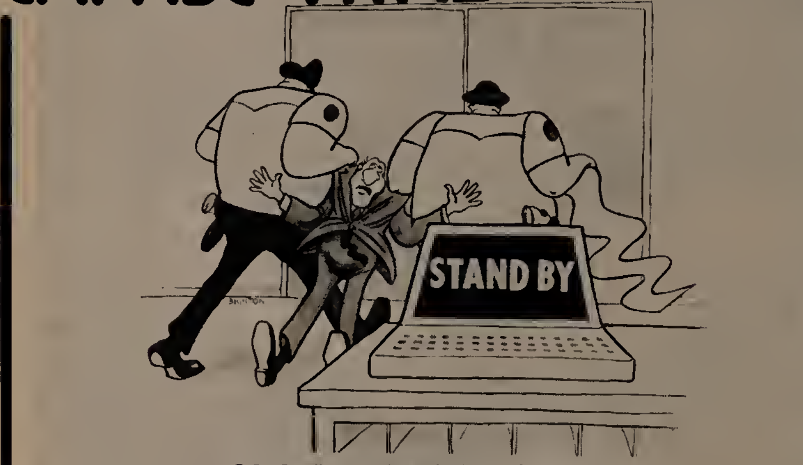

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get something like that from SQL, or some system like that, is quite difficult.

MANOLA: I say the answer ought to be empirical.

CODD: I would say in two words: No end. In other words, there isn't any end to going higher and higher in the level of language as we progress with the field of computing. That has been the trend and will continue to be. Today Prolog is a good example of a very high-level language. There are even higher level languages than Prolog under consideration.

WONG: As long as you don't pay an excessive price for achieving that higher level. I'm not saying there's any inherent reason for sacrificing performance, but very often the inability to implement such high-level languages efficiently is a deterrent to their use.

CODD: A temporary deterrent, perhaps, until the implementation technology is mastered.

BACHMAN: One thing that people in my company have begun to observe is that when we sell data base systems, communications systems, systems software, we also sell application packages. And the implication of buying an application package from us or from anyone else that produces them is that, because the business transaction forms the language of the system, you don't get involved in data base commands or communication commands. We have to implement them, obviously, using some data base and communication commands, but the customer wants business-oriented results. And so having a purchase-order transaction is a high-level command.

FLOOR: If your application system met every requirement that's out there, I think you'd find that your system still needs to be tailored for Company A, and for Company B and so on. So in fact it's only one solution for a very small aspect.

BACHMAN: Let me tell you something that's interesting, something that seems to have happened or is now happening. We used to think about selling software to companies that had 30 to 50 programmers. Now we sell software to companies that have a big IBM machine and four application programmers. They can't afford a systems programmer. They can't afford more than four application programmers.

And so they say there are two ways you can do this: You can tailor an application package to the business or you can tailor the business organization to make it meet the application package.

FLOOR: I'm terrified of this concept of tailoring business organizations. Are we all going to be the same?

BACHMAN: If you're in the savings and loan business, how different is your savings and loan bank from the one on the next corner down the street?

FLOOR: Well, six months ago it was quite different, but I can see where you're heading me . . . *(laughter)*

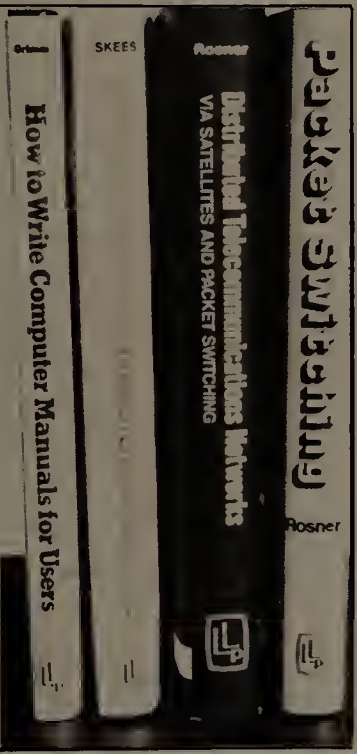
BACHMAN: We're only following the current marketplace requirements. We're not leading it. They're saying, they don't want to invest in application programmers. They want to invest in selling *their* customers, people who deposit in the bank or withdraw, they want to put their skills at that end — not at the data processing end.

WONG: I don't think I would accept the characterization of application programs as a substitute for high-level languages.

CODD: Yes, well, even if you had application generators or packages that satisfy a large number of applications, nevertheless, as the culture develops and customs change, you're going to have to change these packages — as the vendor. As a vendor, I won't want to invest a lot of money in changing the low-level code inside these packages. I want to be able to manipulate these packages very readily. So high-level languages are a necessity for the vendors to keep these application generators up to date.

BACHMAN: Do you imply that relational languages are high-level languages?

CODD: I didn't say anything specifically about relational languages. However, relational languages *are*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high-level. I'm not saying that relational languages are in any sense an ultimate in level.

BACHMAN: Well, are you saying they're higher languages than network languages?

CODD: Yes . . .

BACHMAN: Well, you're entitled to your opinion.

CODD: Yes, I found this true of Network Model 1. That was before Frank Manola and Alain Pirotte came out with Network Model 2. Remember, the model is more than the structures. It's the structures plus the operators.

FLOOR: Following up on this topic of high-level languages, it seems that when we look at the programming language environment, high-level languages have been traditionally languages like APL, which works on the basic data type of the array, and Lisp, which works on the basic data type of the B-tree, or the binary tree.

So I'm just a little curious: Why is it, in the relational model, you saw fit to embed this high-level data access into host languages such as Cobol and Fortran that were clearly designed for more procedural-level code, as opposed to taking the approach of Nomad or Focus?

CODD: I can explain that as a historical thing. I was once concerned with the formal definition of PL/I. Not centrally concerned, but somewhat concerned. And at that time, the IBM Vienna Laboratory was the primary agent concerned with coming up with a formal model for the semantics of PL/I.

When they did that work, they uncovered more glitches in PL/I than all the users that existed at that time and all the compiler writers that existed at that time! And three compilers were under construction, at the very beginning.

So they wanted, and certainly I wanted at the time, to introduce changes to the definition of PL/I. There was, however, a language control board whose main function was to *preserve* the language and *prevent* changes!

The difficulty of getting changes in the definition of PL/I, in the definition of Cobol, in the definition of Fortran, were *severe* at that time. Therefore, I went off to San Jose and I said, "I'm not going to define a new language nor am I going to define changes to PL/I to incorporate set processing. I'm going to define something called a data sublanguage, and that's going to interface with PL/I, Fortran and Cobol." It was just not practical or feasible at that time to get the necessary changes made in the

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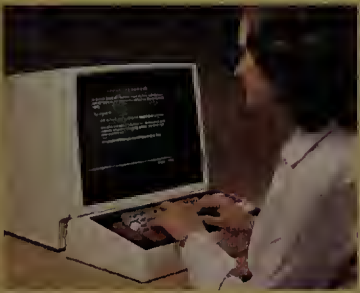

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languages that were either widely used or about to be widely used.

FLOOR: Given the success of languages like Nomad and Ramis and Focus, does that at all change your opinion at this time?

CODD: No. Nomad came along at least five years later — 1974, I believe. Something like that. Maybe '75. And it has not been integrated well with PL/I, Fortran and Cobol applications, to my knowledge, because it *is* a completely separate language, you see.

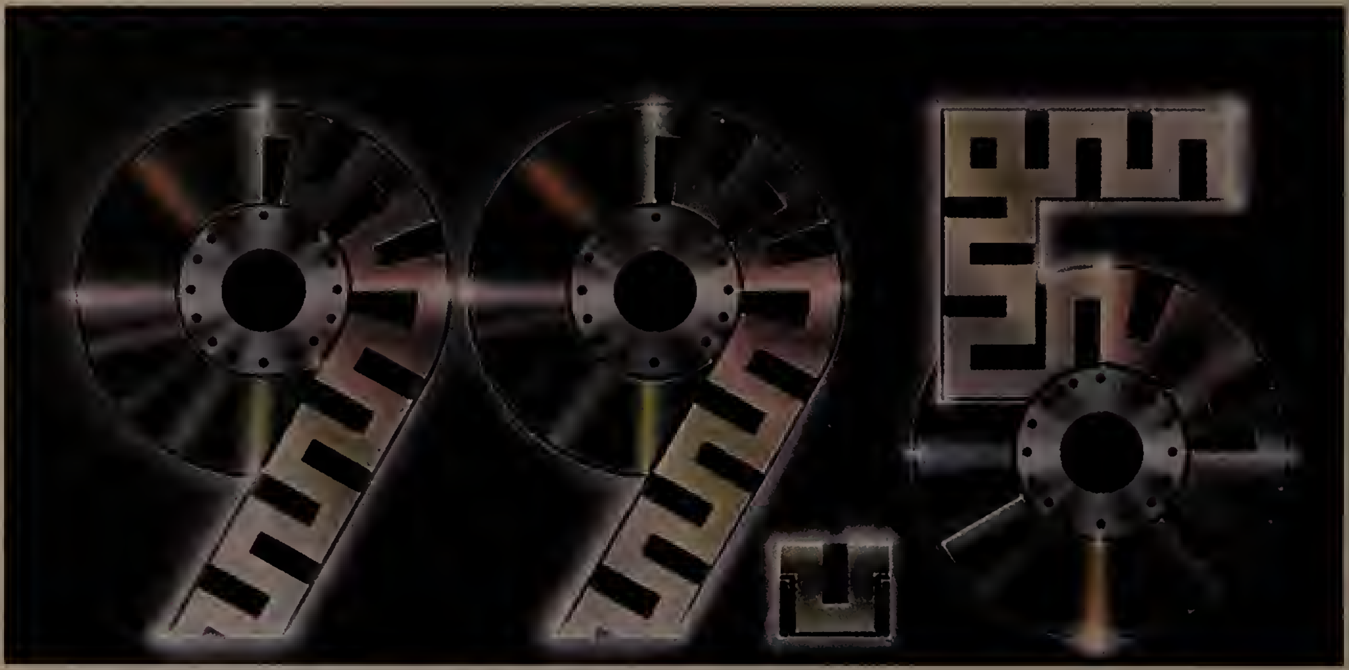
Now, it's found a nice market — and if I had invested in that, or if you had invested in that, I think it would have paid off well. But I'm working in a company whose main market was with the principal host languages. That wasn't something we'd do.

WONG: I would like to direct my next question to Charlie Bachman. Let's assume that in the current Codasyl implementations, there is a close coupling between logical structures and their physical realization. Doesn't that make it difficult to improve on the performance of the system without impacting existing programs?

BACHMAN: I think I would agree with you that most implementations of network systems today have a fairly close correlation between the logical set concept and the set implementation technique which underlies the linked lists.

It is not a situation, though, which means a change in set implementation technique would affect functionality. Taking the example that we typically see for relational systems, where each of the employee records happens to have a department code, I'd say that's a second implementation technique for a set. Because all the required information is there. So if someone wants to find the first member, i.e., the first employee of that department, the next and the next, or find the owner of the set, then the DBMS can return the desired result.

That's two clear implementations. In the literature there have probably been about 10 different imple-



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mentation techniques using binary trees, using n-ary trees, to implement sets. It turns out, though, that the one that was first used, the linked list, happened to be a very efficient technique.

I think that as we move along in the data base technology, we will find that data base administrators will have more and more set implementation techniques at their access to choose from for various performance reasons, and that they can choose them and change them from time to time to optimize both the computer resources and the data storage resources.

WONG: I think, Charlie, it's a departure from the traditional philosophy of Codasyl to detach the logical from the physical to the extent that you do.

MANOLA: I think that this is a departure from the classical *implementation* of the Codasyl systems and a departure from the classical way in which many people have *talked* about those systems. I don't think it's necessarily a departure from the Codasyl philosophy itself.

I think that in the past there certainly has been the bundling of logical and physical. I think it would be difficult to argue against that. But I think that given the data base architecture which Codasyl started out with, where there was only one data description, you naturally cluster those physical declarations that you were able to make easily next to the logical declarations, which makes sense. And when what you're doing is logical clustering of records in the sense of forming group-related objects, you naturally

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want to associate with that logical construct a physical declaration which says, "OK, given that we've just done that, put them close together." Now, as data base architectures tend to grow to the point where you're separating those sorts of things, you see the data declaration changing as well.

WONG: Chris?

DATE: One of the advantages of sets is that they provided physical clustering. But it's not clear to me, though, that you need sets to achieve physical clustering. What you need is the ability to store one record physically close to another. You can do that with a relational model or anything else, it seems to me.

WONG: Unless there is a one-to-many relationship, it's hard to design the structure, in terms of what you store next to what.

DATE: Oh, well let's see if I can give you an example in terms of departments and employees. I don't see why an employee record can't be stored on the same physical page as the department record matching that employee record on department number. This can be done with SQL/DS. Not very straightforwardly, but it can be done.

BACHMAN: I'd like to give a clear example I think everyone would understand, showing the very clear separation between the logical notion of set processing and the physical notion and how it's implemented. Essentially there are three statements that are set manipulators: (1) commands to find the first and next continuing in the set, (2) commands that will find the last and prior continuing backwards around the set and (3) commands used when I want to move from a member to the owner. Three distinct concepts of access.

Now in all the implementations I am familiar with in detail, even if you created a linked list with only a forward pointer from the owner to the first member to the second member to the third member to the fourth member, all three access methods work. They take a little longer in some cases than if the linked list had "owner" positions and "prior" positions. So this states a very clear separation between the functionality and the implementation.

If you said, "Find an owner," if there was an owner pointer, it would go directly. If not, it would go to successive members and eventually find the owner. This is a clear example of the separation of the logical access method and the physical structures implemented.

WONG: Let me move on to the next question, which I would like to direct to Chris Date. It is often said that the relational model is ideal for retrieval — high-powered, high-level operators, relation-at-a-time operators — but it is poorly suited for updates. The problem is the following: There are updates that are natural updates; they are not removal or insertion of tuples, but removal or insertion of entities. And the consequence of such an update is the propagation of updates throughout the data base. Unless there is a vehicle to support such propagation efficiently, the cost in overhead may be high. What is your comment?

DATE: I need to retreat, first of all, into the old differentiation between the model on the one hand and the existing systems on the other. The model as originally defined had some provision for the kind of thing you're talking about. For example, if you tried to delete a department, and

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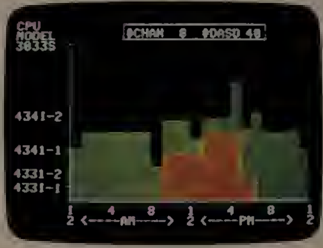

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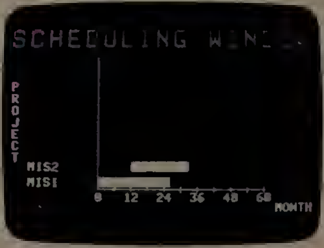

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MANOLA: I'm really not sure how often there would be an incentive for someone to take an existing application and convert it without there being some enhanced functionality associated with the application . . . I would make the observation that as long as the applications continue to work, I wouldn't touch them with a 10-foot pole.

there are some employees in that department, then maybe you're not allowed to, or maybe the thing cascades. As I say, provision for that existed in the model from the word go.

Last year, in VLDB [the Very Large Data Base conference], I had a paper which refined the original idea — and spelled it out in horrible detail. The fact is, though, that very few relational systems so far have supported that kind of stuff. In fact, the only one I know of that does anything at all like that is Nomad, but I could be wrong in that. Nomad does do something. I regard this lack not only as a major deficiency in the existing relational systems, but *the* major deficiency. I'd like to see it fixed as soon as possible.

So, in answer to your question, there are some basic model facilities which have not been implemented — but I don't regard the basic model as fundamentally unsuited. It's just that systems haven't yet done the job.

BACHMAN: I'd like to add one comment. It didn't seem to me that the mechanism you described required any heavy overhead, either.

DATE: Oh yes, thank you, Charlie. Yes, I don't see why there is necessarily overhead. The implementation techniques that applied with systems like IMS can well be used to support relational systems. As a matter of fact, I met a guy last week who was building a relational prototype in England and he has implemented all those ideas I mentioned in a very nice way, which, however, I can't discuss now.

WONG: Let me ask one final question: Data bases are notoriously difficult to design. The problem is not only one of expressing the data in logical definition structures, but to anticipate changes that might occur in the schema and the problem of designing the physical structures for it. It has been said — not by me — that relational systems are particularly ill-suited for physical design because the global structures are difficult to discover. Would you comment?

CODD: Well, I could say briefly that domains — which have been underemphasized in talking about our relational model, and neglected very much, except in IBM's QBE (Query-By-Example) and in a few other implementations — domains provide strong clues as to what sort of transrelational access structures might well be implemented. It's important to distinguish primary domains that collectively correspond to the E-Domain of the extended model RM/T from the other domains, domains of mere attributes, that are non-E-like, for example, the attribute QUANTITY ON HAND.

Not too many people are interested in finding all the occurrences of 3 as the quantity on hand. But a lot of people are interested in finding all the occurrences of 3 as a supplier serial number.

WONG: Let me rephrase my question. What tools do you think we need to design the data base, and what tools exist now in relational systems?

DATE: I'd like to say something to that. It seems to me that relational systems (it seems to me we're talking about the physical level of design) are both easier and harder. They're easier in the sense that we have really more decoupling of logical and physical, and therefore even though you may get the physical design wrong, you can tune later without affecting the logical level. So, you can do a sort of incremental physical design. And that's a good thing.

The bad thing is, to make the system work well at all, you have to have some kind of optimizer — as SQL/DS does, for example — and the whole essence of an optimizer is that it's doing things you don't understand.

The optimizer is going to take advantage of indexes. And you don't know how it works! So you may try and guess what indexes, for example, to put in, but you don't know if you're guessing right. So it really becomes very important to have a physical data base design aid which works hand in glove with the optimizer and tells you where is a good place to put indexes.

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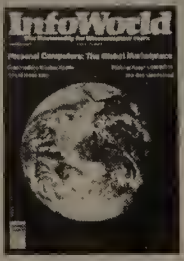

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need a physical design aid.

BACHMAN: Could I respond to your question? I would have started not at the physical design but at the logical or, even better, the conceptual design level. At this level you're not trying to design a data base; rather, you're trying to understand the information which exists within a business. Such an approach is being studied in a number of places, and all have received their focus from the reports of the Ansi/Sparc Study Group on Data Base Systems. They first define what is called the "conceptual schema." Essentially it is a description of the enterprise which does not have any data packaging constraints.

Some of this data may be in the computer, some may be in the manual files and some just in people's heads. And I think this is an essential starting point if you're going to make an improvement. We are not asking which data model we are going to use — we are asking that we start someplace else. Given that you can get the description of the enterprise you're dealing with, you can go from the conceptual design to the logical design level by saying what information we want to keep in each data base. You make that step with computer-aided assistance. You sit and check off "Yes" or "No" to system-asked questions.

You can also go from the logical design to the physical design level with computer-aided assistance, if you have collected the necessary operations statistics: "How many people are we keeping track of? How many customers? How many parts, how many products? And what member distributions are in the relationships? Whether the customer buys one thing or 10,000 things per order, will it make a difference in how the system is going to behave?"

Step by step, you can move down from the top and get a good solid foundation using the conceptual schema as the starting place.

CODD: Charlie, talking about the conceptual schema, makes it sound like you can define the objects in your enterprise and the relationships amongst them without having some representation model at all. Now perhaps I'm misinterpreting what you said . . .

BACHMAN: Ted, what I tried to say is that you have to represent it in some model. The current issue is not whether you represent it relationally or in network sets, but the fact that you first set out to represent the enterprise. Now you are going to have to decide what data model to use. The answer to my question is not what decision to make, but where to start — not by describing the data base, but by describing the information that's pertinent to the enterprise.

CODD: Now, I'll have to agree there!

About the Debate

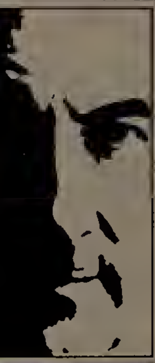
This debate was part of Data Base '82, a portion of the Wang Institute of Graduate Studies' short summer course, the Eastern Institute in Computer Science. Data Base '82 was organized by Prof. Michael Stonebraker, University of California, and directed by Dr. Nancy Martin, the Wang Institute, both of whom assisted greatly in bringing this debate to publication.

The presentation was organized and edited by Catherine Marenghi, Computerworld's *senior editor, features. Lois Paul, senior software editor, provided support and consultation.‡*

An urgent message from:

James Martin

To: 400,000 Programmers throughout North America



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System Gives Users Ability To Tie Many DDP Systems

HARVARD, Mass. — Xyplex, Inc. has introduced a computer system that reportedly provides users with the ability to connect a wide range of computer systems performing various distributed processing functions.

The systems can range from personal business computers, word processors and small laboratory systems to mid-range time-sharing systems and large mainframes, a Xyplex spokesman claimed.

The Xyplex system's integrated front-end processors maximize communications speed and computer capacity while eliminating direct cable connections between terminals and computers, the spokesman said.

The front-end function reportedly removes the terminal-handling burden from the host computer, including character echoing and special character recognition.

Local Environments

Within a local environment (a building or campus), a single cable is used to connect all the terminals and computers, allowing any terminal user to access the computers or terminals. Interbuilding connections are provided by gateways using telephone lines, private microwave channels or fiber-optic links, according to the spokesman.

The first two components of the system to be available are the XP-UN64-A Unibus host interface unit for Digital Equipment Corp. VAX-11s and PDP-11s running under VMS and RSX and the XP-CC8-A terminal cluster controller, which provides connections for up to eight terminals. The XP-UN64-A costs $9,500 and the XP-CC8-A, $5,600.

A one-per-customer software license fee for RSX- and VMS-based host interface units and the cluster controller software is priced at $800 each, Xyplex said from Oak Hill Road, Harvard, Mass. 01451.

Study: 'Greatest Amount of Activity' Focused on Local-Area Micro Nets

By Bruce Hoard
CW Staff

SAN JOSE, Calif. — Even though most industry attention is focused on Xerox Corp.'s Ethernet and broadband networks, the greatest amount of activity is occurring in local networks of personal computers with data rates below 3M bit/sec, according to a recent study by Strategic, Inc.

The study, entitled *Impact of Personal Computer Local Area Networks,* claims that there are 800 local-area networks installed featuring faster than 3M bit/sec transmission rates and well over 12,000 slower ones.

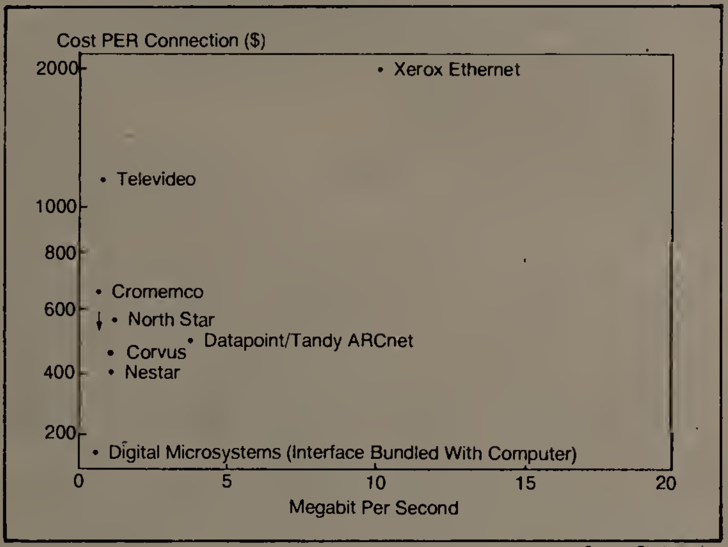
The study predicts sales of personal computer networks will grow to 110,000 in 1987, with 920,000 stations valued at $4.8 billion. In July of this year, there were approximately 12,000 personal computer networks installed, with 65,000 workstations, print and file servers valued at $264 million.

"The price of network interfaces will drop so fast that network hardware, including cables, will be a negligible part of system cost, comparable to installing telephones," the study reported. In addition, the percentage of personal computers in business and education that are connected to networks is expected to grow from 4.4% this year to 17.3% of those sold in 1987.

The average price of a personal computer network is less than $500 and declining rapidly, the report noted, saying Ethernet and broadband networks cost $2,000 and more for a high-speed connection.

The leaders in low-cost networks for personal computers are Corvus Systems, Inc., which has the greatest number of installations, and Nestar Systems, Inc., which has greater revenues from selling all the components of its systems and selling large configurations.

(Continued on Page 78)



Source: Strategic, Inc.

Cost vs. Data Rate of Personal Computer Local-Area Networks

Also Works Through PBX

Unit Offers Direct Communications

KANATA, Ont. — An executive workstation said to communicate directly with other terminals and computers as well as working through a private-branch exchange (PBX) has been unveiled by Mitel Corp. here.

Competing workstations such as Northern Telecom Corp.'s Displayphone and Tymnet, Inc.'s Scanset must be connected to PBXs, a Mitel spokesman noted.

The Kontact terminal, which will cost Canadian users $4,299, is likely to become available in the U.S. in the near future. Mitel is now negotiating with a number of prospective distributors, but its U.S. price has not yet been decided.

Initially, the system will be able to emulate teletypewriters and Digital Equipment Corp.'s VT series of terminals, thus enabling Kontact customers to access a number of computers. IBM 2780/3270 emulation is under development to allow communications with IBM computers, the spokesman said.

Unit Configurations

The unit reportedly consists of a 12-in. green-phosphor display screen, full Ascii keyboard, an attached floppy disk with an unformatted capacity of 500K bytes, a telephone handset and speakerphone and a special-purpose microcomputer with 128K bytes of random-access memory (RAM), expandable to 256K bytes.

Kontact, which utilizes a Motorola, Inc. 6809 microprocessor, is user-programmable in Basic, but the relatively small memory limits its general-purpose computing capabilities, the spokesman said.

The terminal primarily supports a number of business-oriented applications, each controlled by Mitel-supplied software, the spokesman said. An agenda program, for example, enables the user to allocate his time for up to 12 months ahead. Not only are meetings listed in text form, but the program displays a graph showing what time periods and how much of each day have been committed. If the user attempts to make an appointment within a time slot that is already committed, the system reportedly balks and tells him why.

Other features include:

- Incoming messages can be forwarded to a specified list of individuals by depressing a single key.
- Each call is timed and recorded, enabling lawyers and consultants to bill their clients for services rendered by phone.

The terminal connects to the outside world via two voice-grade lines. One is dedicated to voice communications, the other either to voice or data. This arrangement reportedly makes it possible to establish three-way conference calls largely automatically through the Kontact station, whether or not it is tied to a PBX.

In its press release announcing Kontact, Mitel referred to it as "the first member of the Executive Work System, . . . a new family of office products." The second member will be the Phonewriter, designed for executive secretaries, the spokesman said. He expects it to be announced "before the end of this year."

The Kontact workstation will be marketed by Mitel's newly formed Office Products Division, which encompasses Execunet Corp., a Canadian firm acquired by Mitel last June.

Mitel is located at 350 Leggett Drive, Kanata, Ont., Canada K2K1X3.

Communications Processor Emulates 3274-51C Controller

MIAMI, Fla. — Innovative Electronics, Inc. has introduced a communications processor that is said to emulate an IBM 3274-51C communications controller.

The processor converts a Digital Equipment Corp. VT100-compatible terminal into a full-function IBM 3277-1, 3277-2, 3278-1, or 3278-2 terminal communicating with the IBM host using Ebcdic binary synchronous communications, a spokesman for Innovative Electronics said.

Asynchronous Ascii terminals such as the DEC VT100 can be used in both local and dial-up applications.

All keyboard functions are supported including vertical and horizontal cursor movement, erase, insert, delete and 24 program function program-access keys, according to the spokesman for the vendor.

The price for the basic unit is $1,745.

Innovative Electronics is headquartered at 4714 N.W. 165 St., Miami, Fla. 33014.

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ADM 5 (dumb with visual attributes)	645	59
ADM 31 (two page buffer)	1095	88
ADM 21 (full editing/visual attributes)	690	62
ADM 22 (ergonomic/edit/visual att.)	*	62
ADM 24 (ergonomic/graphics/256 fifo)	*	72
ADM 32 (ergonomic ADM 31)	*	90
ADM 36 (DEC system terminal)	*	90
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Diablo 630 KSR (letter quality)	2695	175
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LA 100 RO Letterprinter	1975	130
LA 12-A (port./modem/coupler)	2840	171
TI 783 (portable thermal printer)	1480	n.a.
TI 785 (port./built-in coupler)	1750	120
TI 787 (port./internal modem)	2125	138
TI 810 RO impact	1475	99
TI 810 RO pkg.	1650	107
TI 820 RO impact	1850	120
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VA 103 (300 baud modemphone)	235	19

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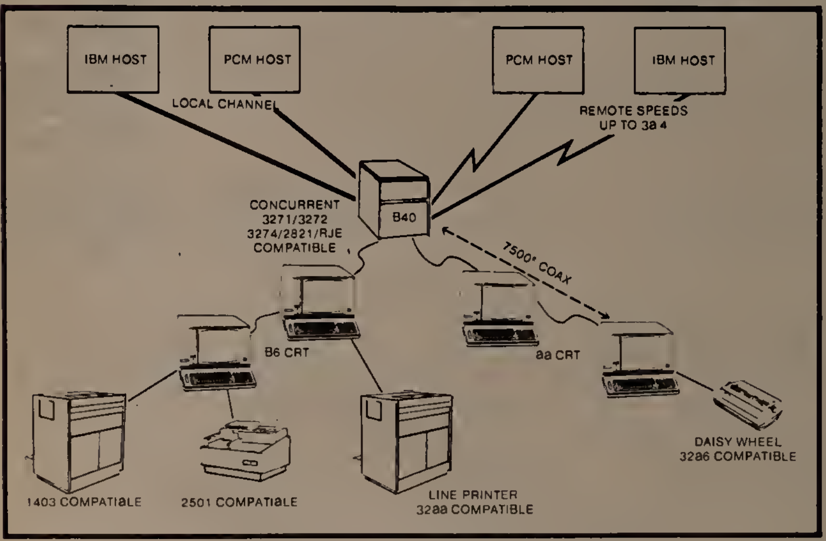

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Northern Telecom SL-1 Adds Optional Features

RICHARDSON, Texas — Northern Telecom, Inc. has added optional features for its SL-1 private branch exchange (PBX) business communications systems.

The optional features include a recorded overflow announcement that may be used to notify specified calling parties that all console attendants are currently busy and ask them to wait for assistance. The feature costs between $436 and $5,226, depending on configuration.

The call park/page feature is said to permit SL-1 console attendants or telephone set users to detach a call and have it held, or parked, within the PBX. A parked call can then be retrieved for reconnection by any SL-1 user. If the parked call is not retrieved within a specified time, it is reconnected automatically to the telephone that originally placed the call in park. The feature also costs between $436 and $5,226.

The vendor also announced enhancements of the SL-1 message center and automated call distribution option packages, which are priced in accordance with software in use.

Northern Telecom is located at 1001 E. Araphaho Road, Richardson, Texas 75081 and 259 Cumberland Bend, Nashville, Tenn. 37228.

Study Covers Local Net Use

(Continued from Page 77)

Both Corvus and Nestar are trying to establish their systems as de facto standards. Datapoint Corp. has the opportunity to compete with these two but is not doing so aggressively, the study notes. Other companies established in the market that intend to compete aggressively include Digital Microsystems, Inc., Televideo, Inc. and the Destek Group.

Multiple processor computers are local networks on very short buses with high data rates on the bus, but low data rates to the user. The study predicts this market is drying up.

The initial thrust in network software is to support single-user operating systems already in use and provide a few basic network applications such as electronic mail.

More and more operating systems and their attendant applications will be supported, and network software will include the ability to access outside systems while emulating various protocols. Network software will also come to include true network applications in which several computer systems cooperate to perform functions they cannot do alone, the study maintains.

"Software support is far more crucial to success than simple hardware performance," it notes. For instance, the difference between the 1M bit/sec Corvus Omninet and the .24M bit/sec Nestar Clusternet is not significant to users, who normally cannot overload either.

The primary use for local networks currently is the sharing of hard-disk storage and printers. These devices can cost more than the network hardware, so there is a considerable gain in having just a few of each that everyone can access, rather than duplicating them at each station.

An important development that will occur over the next year or two is the creation of hierarchical networks, interconnecting several of the current networks, the study reports.

The advantages of that are a much larger system both in numbers of stations and length, much higher total data rate as the subnetworks operate in parallel and low system cost per station by dividing the cost of the high-capacity spine of the network among the large number of stations attached.

The study costs $1,500 from Strategic, Inc. at Suite 215, 4320 Stevens Creek Blvd., San Jose, Calif. 95129.

Device Telexes Via WU, Wang

GARDEN CITY, N.Y. — Office Synergistics, Inc. has introduced a device said to send telexes through Western Union Domestic and Western Union International on Wang Laboratories, Inc. word processing equipment.

The Automatic Telex Generator is used by entering messages and destinations throughout the day to be printed for verification. They appear in a format and style users understand, but will be transmitted in a communications format, a vendor spokesman said.

Once the accuracy of the message has been confirmed, the filing and processing of all messages is accomplished with a minimum of keystrokes. The file is retained for one month, each page representing one day, the vendor said.

The license fee for the generator is $2,500. More information is available from Office Synergistics, Suite 409, 666 Old Country Road, Garden City, N.Y. 11530.

Unit Speeds Up Most Protocols

SAN JOSE, Calif. — Widcom, Inc. has introduced a communications-oriented data compression/expansion unit that is said to extend existing leased-line capacity.

Compatible with most popular synchronous and asynchronous protocols, the DCU-192 is easily added to existing facilities, a vendor spokesman said. The unit connects between the modem and data terminal RS-232C ports to provide a bit-stream compression of two to one.

This allows operations at speeds exceeding the existing communications bit rate. The unit employs three high-speed 16-bit microprocessors to perform the complex encoding/decoding algorithms necessary to ensure reliable performance at rates up to 19,200 bit/sec full duplex.

The DCU-192 is available for $4,950 from Widcom, Inc., located at Suite 220, 1190 S. Bascom Ave., San Jose, Calif. 95128.

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CW 8

Decatenator Runs On Polled Multidrop Nets

ATLANTA — Computer Peripheral Systems, Inc. has introduced a modem-sharing device for Burroughs Corp.; Honeywell, Inc.; IBM; NCR Corp., and other polled multidrop networks where more than one terminal would normally be daisy chained or concatenated to another.

The Decatenator is connected after the modem and allows each terminal to operate independently of the others. It can also be used with terminals that do not contain an additional daisy chain or concatenation port.

The device contains one input modem port and four output terminal ports. Each port will support one terminal or a daisy-chained string of terminals. It will support data communications line speeds up to 19.2K bit/sec and requires no external power, a vendor spokesman said.

The sharing device is available for $195 from Computer Peripheral Systems, 3870 N. Peachtree Road, Atlanta, Ga. 30341.

Workstation Controller Talks Back

PITTSBURGH — Algor Interactive Systems, Inc. has unveiled a multidevice talking workstation controller.

The device, which incorporates a 4-in. speaker and voice chips for program-controlled voice feedback, allows three independent devices, such as terminals, graphics display units, digitizer tablets or printers to be operated in an integrated workstation under program control on a single modem or computer port.

Each port on the box can be selected for input or output under real-time program control.

The controller costs $2,495 from Algor, Suite L3, Essex House, Essex Sq., Pittsburgh, Pa. 15206.

Carterphone 9830 Terminal Compatible With Burroughs

DALLAS — Carterphone Communications Corp. has introduced a terminal designed for compatibility with the Burroughs Corp. TD830 and MT983. Installation and setup are said to be identical to that of these two Burroughs terminals.

The Carterfone 9830 offers a standard display memory of 4,000 char., an optional 4,000-char. extended memory, programmable function keys, integral numeric pad, concatenation with autobypass, addressable serial printer port, help message, line monitor mode and a confidence test, the vendor said.

The concatenation with autobypass feature is said to allow any powered-down station in a concatenation string to be bypassed automatically. This is said to eliminate need for cable reconnection. The terminal supports any RS-232 printer, a vendor spokesman said.

The terminal is available for $1,795. More information is available from Carterphone Communications, Suite 1400, 1111 W. Mockingbird Lane, Dallas, Texas 75247.

Modem Works Limited Distance

LINCOLN, R.I. — International Data Sciences, Inc. has introduced a limited-distance modem designed for asynchronous operation over two- and four-wire nonloaded metallic conductors at speeds up to 19.2K bit/sec.

The Model 6200 features internal strap selections for receiver impedance, receiver equalizer and two- or four-wire operation. It employs a baseband modulation scheme that varies the voltages of the transmit signal on a balanced line requiring dc continuity. Its data terminal equipment interface meets RS-232 and V.24 specifications.

The company has also introduced its 8501 Data Patching and Monitoring Module that is said to allow the user to switch, patch and monitor all 25 leads of the EIA interface and display three interface signals.

The modem is available for $250; the 8501 is available for $195. More information on both products is available from International Data Sciences, 7 Wellington Road, Lincoln, R.I. 02865.

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Packages Integrate Micros Into Corporate Net

SAN FRANCISCO — Integrating microcomputers into the corporate data network is the goal of two new products introduced here by the Datalex Co.

The software packages that achieve this integration are Entrypoint, which turns most desktops into screen-oriented intelligent data entry systems for stand-alone or distributed DP applications, and Passport, which can be used with Entrypoint to provide a communications link between mini and mainframe computer hosts, according to the vendor.

Entrypoint reportedly enables high-level and user-friendly screen formatting and includes a data validation interface, which checks each keystroke entered. For example, if a number is entered into a letter field, the user is signaled immediately by an error message.

Passport is an adaptable remote communications program for file or program transfer between microcomputers and mini or mainframe systems. Completely menu driven to match any micro to the host, this product allows the microcomputer to load and store files and programs from the mainframe or to output them to locally supported devices, the vendor said.

Features

This product reportedly features bidirectional Ascii or binary file transfer, transfer of groups of files or volumes, a simple user interface, program initiation from either micro or host, data integrity, blank compression, bidirectional control of commmunications and screen options and optional reformatting of transactions from the micro.

These Datalex programs use the portable UCSD P-System that runs on microcomputers built around most popular microprocessors, according to the vendor. These include Intel Corp.'s 8080, 8085, 8086 and 8088 machines; Zilog, Inc.'s Z80 and Z800; Motorola Corp.'s 68000; MOS Technology, Inc.'s 6502; Texas Instruments, Inc.'s TI-9900; and Digital Equipment Corp.'s LSI-II. The programs communicate with minis and mainframes from IBM, Hewlett-Packard Co., DEC and others.

Entrypoint costs $1,000 and Passport sells for $400. Datalex can be contacted for further details at Suite 406, 650 Fifth St., San Francisco, Calif. 94107.

Virtual System Helps Terminals Emulate 3270s

MOUNTAIN VIEW, Calif. — Icot Corp. has introduced a virtual terminal system said to allow up to six different types of Ascii terminals or personal computers to emulate more sophisticated IBM 3270 series terminals.

The Icot 351 can allow six users to be on-line to two applications simultaneously, the vendor said. Each user reportedly can switch back and forth between applications without logging off either session. Communications are provided using IBM Binary Synchronous Communications and IBM 3271 Synchronous Data Link Control protocols at speeds up to 19.2K bit/sec.

The system is available for $5,800 from Icot, 830 Maude Ave., Mountain View, Calif. 94043.

Batch Program Supports IBM

NEW YORK — Computer Dynamics, Inc. has announced that its Batch Communications Program (BCP) now provides host support for the IBM 5280, Series/1, 4321, System/3, System/32, System/34, System/38 and 3741 distributed data processing systems.

It also supports communications with the System/23 Datamaster, the IBM Personal Computer, the 5520, the 5230 and Displaywriter systems, the vendor said. It supports 400 to 500 terminals and is a multitasking communications system that has the capability to transmit over 100 communications lines simultaneously.

The price of the BCP varies from $8,000 for the single-line version to $30,000 for the multitasking version, which will support up to 100 communications lines or 1,000 terminals. More information is available from Computer Dynamics, Suite 407, 390 Fifth Ave., New York, N.Y. 10018.

Modem Out for Lines Or Switched Networks

SUNNYVALE, Calif. — Racal-Vadic, Inc. has introduced a 4,800 bit/sec modem said to operate without any conditioning level requirements over two-wire switched networks or two four-wire leased lines.

The VA4840 can operate in a point-to-point network or in a multipoint environment. It features automatic adaptive equalization, allowing the modem's receiver to change its filtering and adapt to different telephone line conditions involving amplitude roll-off, phase delay, frequency offset and carrier-phase jitter.

It costs $1,600 from 222 Caspian Drive, Sunnyvale, Calif. 94086.

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Provides Error-Free Channel

Modem Out for High-Speed Devices

CANOGA PARK, Calif. — Canoga Data Systems, Inc. has introduced a modem that is said to be plug-compatible with high-speed, 1.544M bit/sec data devices and provides an interference-free and error-free data channel over distances up to two kilometers.

The Model CSY306T1 modem is a fiber-optic product that replaces conventional wire cable in data link applications such as satellite down-link circuits, computer-aided design and manufacturing installations and CPU-to-CPU communications.

Available in stand-alone or rack-mount packaging, the modem is suited for use in existing data communications systems or in new installations, a vendor spokesman said.

The unit is available for $1,800 from Canoga Data Systems, 21218 Vanowen St., Canoga Park, Calif. 91303.

Alarm Control Unit Out

WORCESTER, Mass. — A fiber-optic alarm control unit for enhancing the reliability and security of video, audio and data communications is available from Artel Communications Corp.

The ACU-2000 plug-in module alarms up to seven communications channels with audible and visual alarms and also provides an automatically switched redundant power supply.

It can be used to detect and foil intrusion in secure military communications and monitor critical channel operation in high-reliability local network and trunking applications.

The product plugs directly into the vendor's SL-2000 Fiber Optic Transmission System 19-in. card frame and costs $600, according to Artel, which can be reached through P.O. Box 100, W. Side Station, Worcester, Mass. 01602.

WP Terminal Can Emulate Popular Units

ST. LOUIS — Micro-Term, Inc. has introduced a full-page word processing terminal displaying 66 lines by 80 char. of text on a single screen. The terminal may also be reprogrammed by the user to emulate other popular terminals by assigning different control codes and escape sequences for normal functions.

The Ergo 4000 is compatible with the Digital Equipment Corp. VT100 terminal in both Ansi and VT52 modes, the vendor reported. It also features bidirection pass-through printer port, 15 user-programmable function keys, savable set-up mode and alternate character generation. Also included are diagonal cursor movement, margin bell and tabs, screen saver and transparency mode.

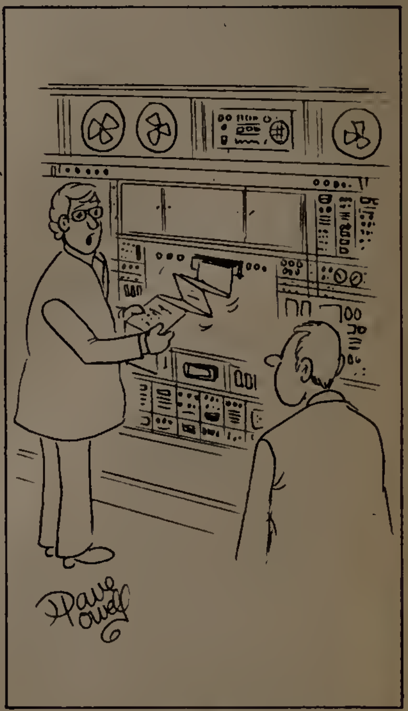
The terminal is available for $1,695 from Micro-Term, Inc., 1314 Hanley Industrial Court, St. Louis, Mo. 63144.

AT&T Text Out On Bridging Net

NEW YORK — AT&T has released a technical reference describing the network Data Bridging interface, which the Bell System plans to support beginning in 1983, pending business decisions and regulatory approval.

The capability is said to allow for the multipoint bridged connection of terminals through an interface that will follow the specifications of the evolving CCITT recommendation for Group 4 facsimile, according to a vendor spokesman.

The technical reference describing the network Data Bridging interface (PUB 54050), entitled "Data Bridging Network Compatibility Specifications," costs $11 from AT&T at Publishers' Data Center, Inc., which can be reached through P.O. Box C738, Pratt St. Station, Brooklyn, N.Y. 11205.



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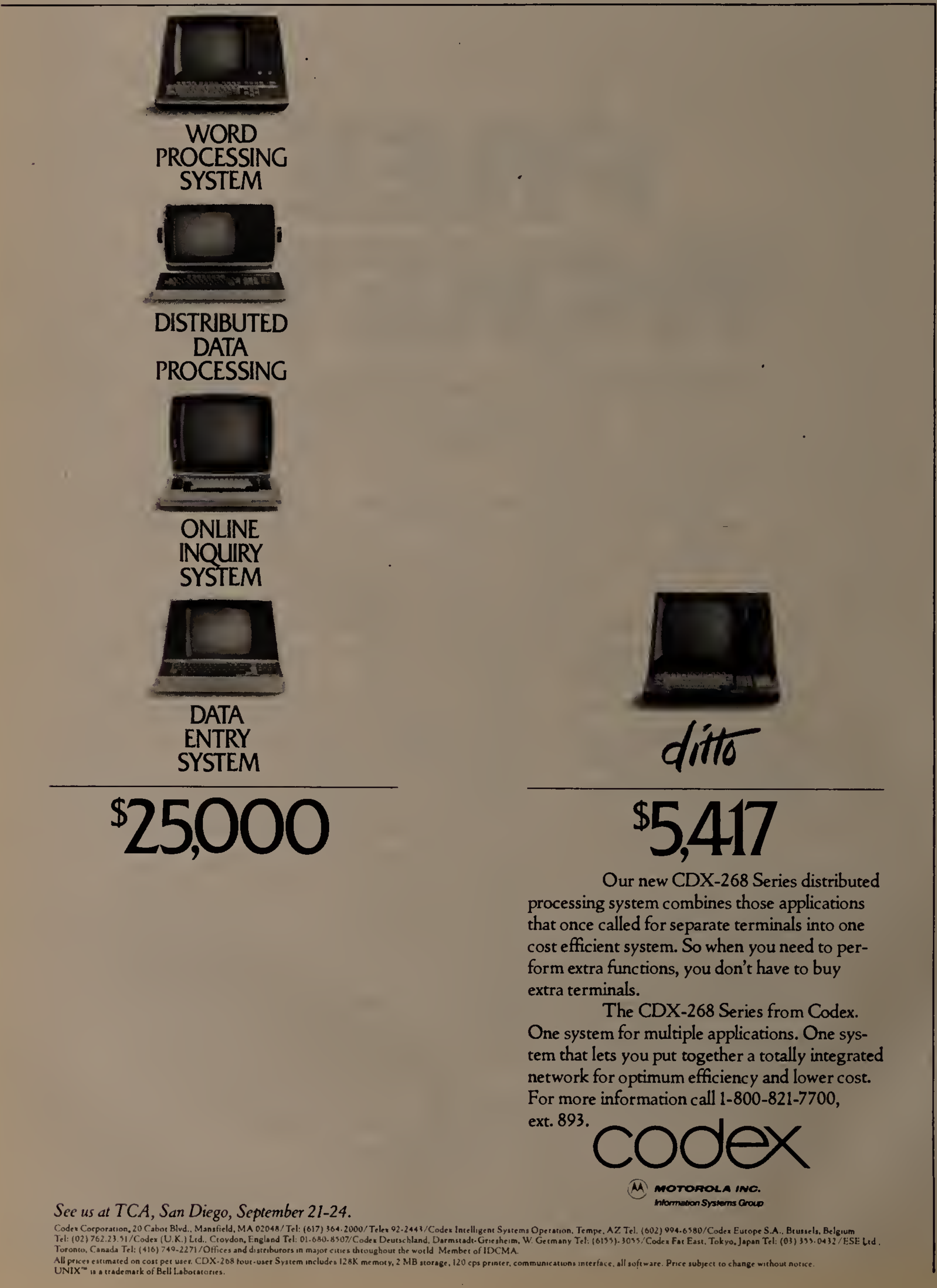

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Year-Old DP Start-Up Offers Field 32-Bit Mini With Up to Three Buses For Science, Engineering

LITTLETON, Mass. — The Massachusetts Computer Corp. (Masscomp), a year-old start-up based here, announced its first product last week: a high-performance 32-bit minicomputer for scientific and engineering applications that boasts a series of dedicated processors and up to three system buses.

The MC-500 features a main 32-bit processor (dual Motorola, Inc. 16-bit 68000 chips), a 4K-byte cache memory, up to 6M bytes of error-checking and correcting memory and a virtual address space up to 16M bytes. The system can also include two independent processors: a user-programmable CPU for data acquisition and control that can input or output analog and digital data at rates up to 2M byte/sec and one that is geared for graphics.

In benchmarks performed by the firm, the system reportedly operated at a performance level equal to Digital Equipment Corp.'s VAX-11/750 computer. However, the MC-500 is said to cost 25% to 30% of the DEC machine's price.

The performance-oriented system was basically designed for three applications: graphics, high-speed computations and data acquisition. Typical applications might include medical or geophysical research. Several systems are already scheduled to be installed, and the firm expects to have 100 to 150 installed over the next year.

The system's three processors are tied to physical memory (from 512K to 6M bytes) via the firm's MC-500 bus. This bus can reportedly support 4-byte transfers using a block-mode protocol. The memory system bandwidth is 8M byte/sec. The MC-500 bus can also be used to access an optional floating-point processor, as well as an array processor, a spokesman said.

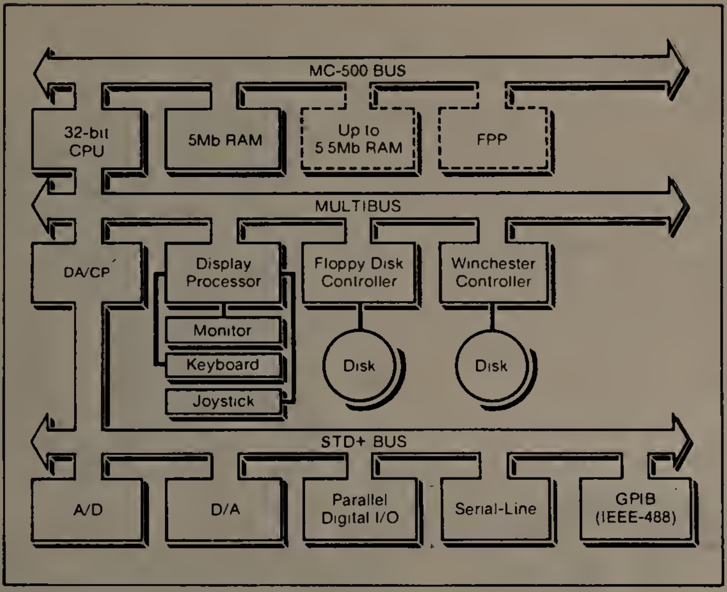
Peripherals, such as tape and disk drives and CRTs, are accessed via an Intel Corp. Multibus. The Multibus supports multiple disk and multiple Ascii terminals, network hardware and software-based printers and plotters. It can also support up to four independent display processors, as well as the data acquisition and control processor.

The third bus, called STD+, was developed by Masscomp and was designed to support laboratory instrumentation. It provides a data rate up to 2M byte/sec and sports a parallel digital I/O interface, a serial line interface and a general-purpose interface bus.

Enhanced Unix

Standard software for the system includes Bell Laboratories' Unix with real-time enhancements, a menu-driven user interface and window management system and acquisition and display software libraries. While the Unix operating system is licensed from Bell Labs, Masscomp enhanced it with such features as virtual memory support, memory-locked processes, contiguous files, priority-scheduled processes and priority interrupt-driven multitasking.

The MC-500 also includes a remote diagnostics capability and is fully supported by Masscomp, the spokesman noted.



MC-500 System Achitecture

Masscomp's 32-Bit Mini

The system also supports the bisynchronous communications protocol (offered under Unix), and will eventually support X.25 and Ethernet, he said.

The cost of a typical system, targeted for data acquisition and control, is about $36,000. This includes 27M bytes of Winchester storage, a 1M-byte floppy disk drive, 512K bytes of memory, a 4K-byte cache, three serial lines, real-time Unix software, a graphics and data acquisition and control processors, a 15-in. CRT display, joystick, remote diagnostics and menu system user interface and window management system.

A graphics-oriented system costs about $31,800, and other systems start at $28,000. OEM discounts are available, the spokesman said from the firm at 543 Great Road, Littleton, Mass. 01460.

Ties SI Controllers to VAX-11/750

SI Introduces Single-Board Interface

MILPITAS, Calif. — System Industries, Inc. (SI) has introduced a single-board interface that reportedly permits SI's Model 9400 and 9800 disk systems controllers to be connected to the Digital Equipment Corp. VAX-11/750. The interface can boost a VAX-11/750's data throughput and permit multiple processors to share the same data base, SI claimed.

When plugged into any of the VAX-11/750's three high-speed adapter slots, the interface is said to allow the 9400 and 9800 controllers to communicate directly with the DEC processor's CPU Memory Interconnect bus.

The interface is said to support multiple disk-system types, including Winchester and storage-module drive units, without necessitating any changes to a user's existing software. It also makes disk subsystems software-transparent to Bell Laboratories' Unix, VMS and other widely used VAX-11/750 operating systems, the spokesman said.

With a 160M-byte Winchester disk system and controller, the interface costs $15,200 from SI, located at 1855 Barber Lane, Milpitas, Calif. 95035.

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'Pixelcaster' Available

Intelligent Visual Preprocessor Unveiled

ANAHEIM, Calif. — Vision Peripherals has introduced an intelligent visual preprocessor that is said to allow computers to develop and implement image-processing algorithms.

The Pixelcaster, which is available in a two-, three- or four-board set, reportedly allows the computer to take advantage of all information in a video signal, including color. Applications include video-text recognition, noncontrast measurement, robot vision, remote monitoring and intrusion detection, a spokesman said.

The device operates via an RS-232C interface and features a Zilog, Inc. Z80A CPU, a high-speed memory for storage of up to 1,024 image samples and coordinates of sample locations. The Pixelcaster responds to commands by performing a function, such as sample, load memory, load offset or jump to a routine, the vendor explained. The command set was designed to be compatible with mainframe, mini or personal computers that use a standard RS-232C interface.

Programs for the Pixelcaster reportedly can be written in any high-level language, including Basic. A 1K-byte random-access memory (RAM) is available on board for data and code, along with 2K or 4K of read-only memory (ROM). An additional 48K of RAM and up to 16K bytes of ROM can be added by plugging in an optional memory-expansion board.

The Pixelcaster is priced from $650 to $790, depending on the user's configuration.

Vision Peripherals is located at Suite 301, 2612 W. Lincoln Ave., Anaheim, Calif. 92801.

Add-In Memory Out for Vax

SANTA ANA, Calif. — The Standard Memories Division of Trendata Corp. has announced a 2M-byte semiconductor add-in memory for use in Digital Equipment Corp. VAX-11/780 and 11/782 computers.

The Pincomm 780S+ memory module, said to use full 64K-bit random-access memory, reportedly is hardware- and software-compatible with VAX-11 machines using DEC MS780 memory systems or DEC MA780 multiport memory systems.

The 1M-byte version costs $3,400, and the 2M-byte version costs $6,225; both carry a four-year warranty.

Trendata is located at 3400 W. Segerstrom Ave., Santa Ana, Calif. 92704.

HP Users Get 240M-Byte Drive

Qualex's Model 3321

WESTLAKE VILLAGE, Calif. — A 240M-byte removable hard disk drive for Hewlett-Packard Co. computer systems has been introduced by Qualex Technology, Inc.

The Model 3321 drive reportedly incorporates the same controller as Qualex's Group 3000 60M-byte Winchester drive introduced earlier this year. It has a mean time between failures rated between 4,000 to 6,600 hours with four to six disk pack swaps/day and can be fitted with four proprietary cache storage devices and optional dual I/O ports.

The drive can be linked with up to 15 similar units for high-storage requirements, a spokesman reported.

The Model 3321 drive costs $26,500. Additional slave units are priced at $21,450 each from the firm at Suite 110, 31220 LaBaya Drive, Westlake Village, Calif. 91362.

Plotter Features Resident Program

LANSDALE, Pa. — A plotter featuring low-inertia grit-roller paper transport technology has been introduced by Numonics Corp.

The Model 5412 features a resident program for plotting smooth nonpolygonal arcs. Firmware for vectors, arcs, line types, markers, 96 Ascii characters and character and marker scaling is standard.

The plotter costs $1,295 from the firm at 418 Pierce St., Lansdale, Pa. 19446.

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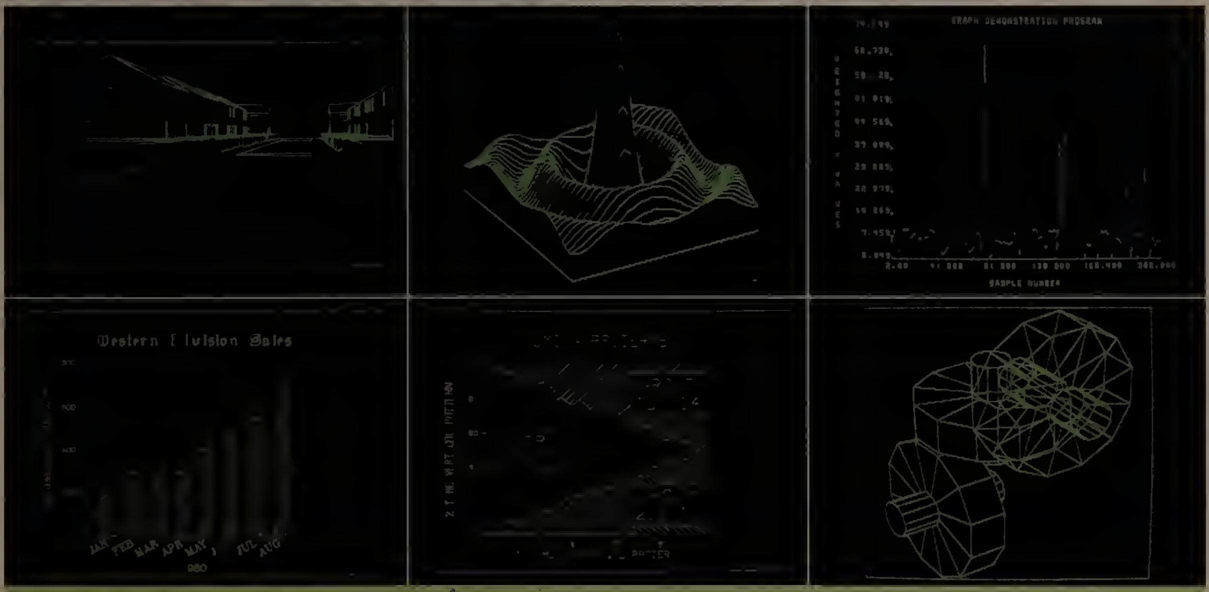

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CAD/CAM System Offers Desktop Display Unit

SANTA CLARA, Calif. — A computer-aided design and manufacturing (CAD/CAM) system featuring a desktop display unit and a desk-like enclosure has been introduced by Calma Co.

The Calma 170 plugs into a standard 110V outlet and features a 19-in. graphics display unit. The display is available in black-and-white or color and reportedly features high-resolution raster technology.

The system can operate as either a self-contained, stand-alone unit or as part of a distributed network of automated systems. It costs $99,950 and was designed to be an integral part of the Calmanet high-speed local-area network. Calma is at 5155 Old Ironsides, Santa Clara, Calif. 95050.

Tape Controller Links Drives To IEEE-488 Standard Bus

BELTSVILLE, Md. — Ideas, Inc. has announced the Series 4600, a magnetic tape system controller that links ½-in. tape drives to an IEEE-488 standard bus.

The Series 4600 is an enhanced version of the controller announced by the firm in 1976. Features include a tape speed from 25 to 90 in./sec and a transfer rate up to 144K bytes/sec.

The unit comes with 19K bytes of double-buffered memory, which can be expanded to 24K bytes, a spokesman for the vendor said.

The Series 4600 costs $4,995, the vendor said from 10759 Tucker St., Beltsville, Md. 20705.

System Handles Graphics

LAFAYETTE, La. — An Intel Corp. 8086/87 16-bit processor-based color graphics system has been announced by Phoenix Computer Graphics, Inc.

The Phoenix 1024 High Resolution Color Graphics System is said to feature a viewable matrix of 1,024 pixels by 1,024 pixels, with either 4- or 8-bit planes of pixel-addressable memory.

The unit's writing speed is 800 nsec/pixel with zoom magnification of 1:1 to 16:1, the vendor claimed. The system uses Digital Research, Inc.'s CP/M-86 operating system. Standard communications mode is RS-232C with protocol being asynchronous 8-bit plus start and stop bit. The transmission speeds range from 110 bit/sec to 9,600 bit/sec. The device also supports IBM System Network Architecture/3270 protocols.

The system reportedly provides 16M bytes of addressable memory space, 64K bytes of random-access memory (RAM) technology with 128K bytes of RAM or system memory. The 1024-01 desktop model starts at $20,000, and the 1024-10 console model ranges from $28,000 to $30,000 from the firm at 1309 Pinhook Road, Lafayette, La. 70503.

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Mini Bits

Uninterruptible Power Supply Designed for Minis, Micros

ANAHEIM, Calif. — General Power Systems, Inc. has announced a line of uninterruptible power supplies (UPS).

Called the GPS-906 and GPS-2006, the units are rated at 90 and 200W, respectively. Functioning similarly to UPS systems for larger processors, the units reportedly eliminate problems caused by common and transverse-mode noise, transient conditions, frequency shifts, over/under voltage and complete loss of power.

The units can provide uninterruptible power for 10 minutes. The GPS-906 costs $395, the GPS-2006, $695. The vendor is located at 1400 N. Baxter St., Anaheim, Calif. 92806.

Automatic System Protects Units Against Primary AC Loss

SAN DIEGO — The Powermark Division of Topaz, Inc. has announced a 300-VA square-wave Automatic Power System (APS) designed to protect small systems against losses of primary ac power.

The APS comprises an internal 20-ampere-hour battery, battery charger, static inverter and power transfer switch. When line voltage falls below a predetermined level, the transfer switch transfers the load from the ac line to the APS inverter; transfer time is said to be 4 msec. The inverter converts the battery power from dc to ac.

Backup times range from 12 to 180 min, depending on the APS model and load rating. Prices start at $690 from Topaz, 3855 Ruffin Road, San Diego, Calif. 92123.

Turnkey Patient Accounting Out for Medical Practices

LANSDALE, Pa. — Paulmarc Systems, Inc. has announced a turnkey patient accounting system for ophthalmologic and other medical practices.

Based on a Digital Equipment Corp. PDP-11/23 16-bit processor, a basic system includes 128K-bytes of main memory and a 34M-byte Winchester disk drive. Also included is a 17M-byte tape cartridge unit, a four-port multiplexer, two display terminals and one printer.

A basic system costs about $40,000, the vendor said from Green and Lincoln, Lansdale, Pa. 19446.

TI-Based Turnkey System Designed for Manufacturers

EL SEGUNDO, Calif. — A Texas Instruments, Inc. TI 990-based turnkey system made for manufacturers and distributors is available from Mini Data Systems, Inc.

A basic Minitopic System includes 256K-bytes of main memory, a 32M-byte disk drive, one video display terminal, a 75 char./sec printer and a choice of the Distribution Management System, Accounting Management System or Materials Management System application modules.

The basic system costs $29,900 from Suite 359, 2041 Rosecrans Ave., El Segundo, Calif. 90245.

Dual-Sided Flexible Certifier Handles Quality Assurance

PHOENIX — A dual-sided 5¼-in. flexible disk certifier for quality assurance, incoming inspection and engineering evaluation applications has been announced by Three Phoenix Co.

The 3PX151 features microprocessor control, operator-selectable testing, 48 track/in. or full-surface testing and 96-track/in., 5¼-in. drive.

The unit's base price is $19,500 from the firm at 21639 N. 14th Ave., Phoenix, Ariz. 85027.

Specifics of Broad Overview While Auditing Own System Offers Productivity Answers

By Robert E. Berkman

Special to CW‡

OK. You've installed a minicomputer system in your company and it has resulted in a huge improvement in productivity over your manual system. The system is running and you're happy.

But is the system operating to its maximum efficiency? Can you squeeze just a little more work out of your new automated workhorse?

Small business systems users, who install computers without the support of their own technical staff or the use of consultants, often end up laboring under the burden of ineffective systems. To make matters even more difficult, in some cases, the small user does not know the system is ineffective.

Compared to a manual system, the speed and data availability of the computer may be a huge improvement.

However, compared to other systems and approaches, the computer may be functioning at a level that leaves much to be desired.

Broad Overview

In some cases, there is definitely something wrong with the computer system. Not only is it not working at an optimum level, but it is actually creating new problems. In this case, getting the system to function often involves a series of hit-and-miss fixes.

At best, there is temporary relief; usually, there is constant turmoil.

On a regular basis, the small systems user has to step back and take a broad overview of the entire system.

This review should not only include the programs, but also include procedures, personnel and the use of information generated by the system. It must include all factors that contribute to a computer installation's failure or success.

Some factors are obvious. Others are not so obvious. For those who want to do their own system audits to determine if the system is working to its maximum efficiency, the following guidelines can be used as a road map.

If you are using a consultant, these steps might provide a basis of what questions to ask and what points to examine and review:

- Data Integrity. Are there questions about the accuracy of the data and information being provided? Specifically, in what reports and in which files is the accuracy in question, what procedures can be established to validate the data and what procedures can be established to improve accuracy?
- System Controls. The manual controls that are set up to authenticate the input system must be reviewed. If none exist, they must be established immediately.

Are control procedures used to spot error conditions designed to react on an immediate basis? Are these controls designed to focus on small data segments that will allow the user to review and pinpoint problems easily?

- Data Validation. The system should be geared to validate any possible entry field at the earliest point in time. On-line systems generally should check to ensure that data is validated on-line rather than going through edit runs and batch updates.

The machine's data should be matched against master files for standard type data and for reasonableness in other numeric fields.

- Management Information. The information used to make management decisions should be valid for making those decisions.

Often, the information being used only provides a piece of the total picture or a distortion of the characteristics on which the decision is to be made.

- Operational Effectiveness. Procedures should be established from the user's perspective. Users should not have to go through awkward procedures to be able to operate the system.

Response times should be checked to ensure they are adequate for a productive environment. The audit should review work volumes, current computer demands and the system's saturation point.

- Missing Requirements. The audit should investigate the possibility that vital information requirements are not being met.

It should also review what applications are candidates for automation and what impact they have on other applications and system performance.

- Operating Environment. Is the operating/system environment safe from catastrophic data loss?

Backup procedures should be readily available to protect against power spikes and losses, as well as a total system breakdown. The audit should pinpoint what circumstances could shut down the operation and how fast you can recover from them.

- Personnel Dependency. How dependent are you on key individuals? Is the system self-supporting, or could removing a key person cause substantial risk to the company's ability to function?
- Documentation. Is the documentation adequate? Written procedures and instructions should be within easy reach of the user. Also, any new programmer should be able to walk in and maintain or do addition and modifications easily to the system.

Berkman is a consultant and president of Robert E. Berkman Associates in Morris Plains, N.J.

Wang Processors Receive Add-In Memories

NEWTON, Mass. — EMC Corp. has announced a line of add-in memories for Wang Laboratories, Inc. VS series processors.

Available in 256K-, 512K- and 1M-byte increments, standard features include an error light that indicates when the memory has detected a fault and an off-line switch that allows a user to disconnect the memory electrically without actually removing it from the chassis, the vendor said.

The VSM-1MB 1M-byte board uses a 64K-byte memory chip with very large-scale integration.

The 1M-byte version costs $9,500, the vendor said from 385 Elliot St., Newton, Mass. 02164.

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Disk Drives Out For Apple III

SANTA ANA, Calif. — The Micro-Sci Division of Standun Controls, Inc. has introduced a line of disk drives for the Apple Computer, Inc. Apple III computer.

The Model A3 with 143K bytes reportedly has the same capacity as the Apple Disk III, but at a lower price. The A73 has twice the capacity at 286K bytes with track-to-track access of 5 msec.

The A143 offers the same 5-msec seek rate plus 572K bytes of capacity. All utilize the existing Apple III power supply and controller. The A3 costs $449, the A73 costs $649 and the A143 costs $799, a spokesman said from 2158 S. Hathaway St., Santa Ana, Calif. 92705.

Aimed at Small Law Firms

Turnkey Time Accounting System Bows

NEW YORK — Turnkey Information Processing, Inc. has introduced a service/turnkey time accounting system aimed at smaller law firms with up to 25 lawyers.

Turnkey Time Accounting (TTA), reportedly based on the Prime Computer, Inc. Model 450 with 2M bytes of main memory and 300M bytes to 4.8G bytes of disk storage, offers time and disbursements accounting, general ledger, accounts receivable, docket control, records management and conflict-of-interest applications.

The service is available on a per use basis and includes 24-hour computer access. The cost is approximately $150/man/mo and can include the free use of a terminal and 120-char./sec printer.

Prices for a turnkey system vary greatly depending on the size of the law firm, a Turnkey Information Processing spokesman said from 500 Fifth Ave., New York, N.Y. 10110.

Umerlin Lets TRS-80 Users Run Software Developed for IBM Micro

CULVER CITY, Calif. — Micro Projects Engineering Co. has announced Umerlin, an interface that reportedly allows users of Radio Shack TRS-80 Models I and III processors to use software developed for use with the the IBM Personal Computer.

The self-contained Umerlin unit incorporates an Intel Corp. 8088 microprocessor, 64K bytes of direct random-access memory (expandable to 256K bytes) and 8K bytes of erasable programmable read-only memory, the vendor said.

The TRS-80 processor is used as a slave I/O processor for Umerlin access to the Radio Shack CRT terminal, floppy disks and serial and parallel ports, a spokesman for the vendor said.

Umerlin includes Digital Research, Inc.'s CPM/86 operating system and costs from $1,195. The vendor is located at Suite C, 10810 W. Washington Blvd., Culver City, Calif. 90230.

IBM Micro Gets Increased Storage

CANOGA PARK, Calif. — Interface, Inc. has expanded to 2.6M bytes, the maximum storage available on its 5¼-in. floppy disk drives for IBM Personal Computers.

The firm's floppy disk drives feature a double-sided, double-density disk that provides 650K bytes of IBM formatted storage. By adding two drives internally and using two external drives, IBM Personal Computer users can achieve the 2.6M byte storage capacity, the vendor said.

A quad-density, rack-mountable 650M-byte drive costs $450 and a quad-density, externally-mounted 650M-byte drive costs $560, the vendor said from 7630 Alabama Ave., Canoga Park, Calif. 91304.

Combination Board Bows for IBM Micro

SUNNYVALE, Calif. — Data Mac Computer Systems Co. has announced a combination memory expansion and asynchronous communications controller board for the IBM Personal Computer.

The board contains 64K- to 256K bytes of memory and reportedly can be configured with either one or two asynchronous communications devices. The board reportedly frees I/O slots in the Personal Computer.

The board costs between $550 and $1,239, depending on the configuration, the vendor said from 680 Almanor Ave., Sunnyvale, Calif. 94086.

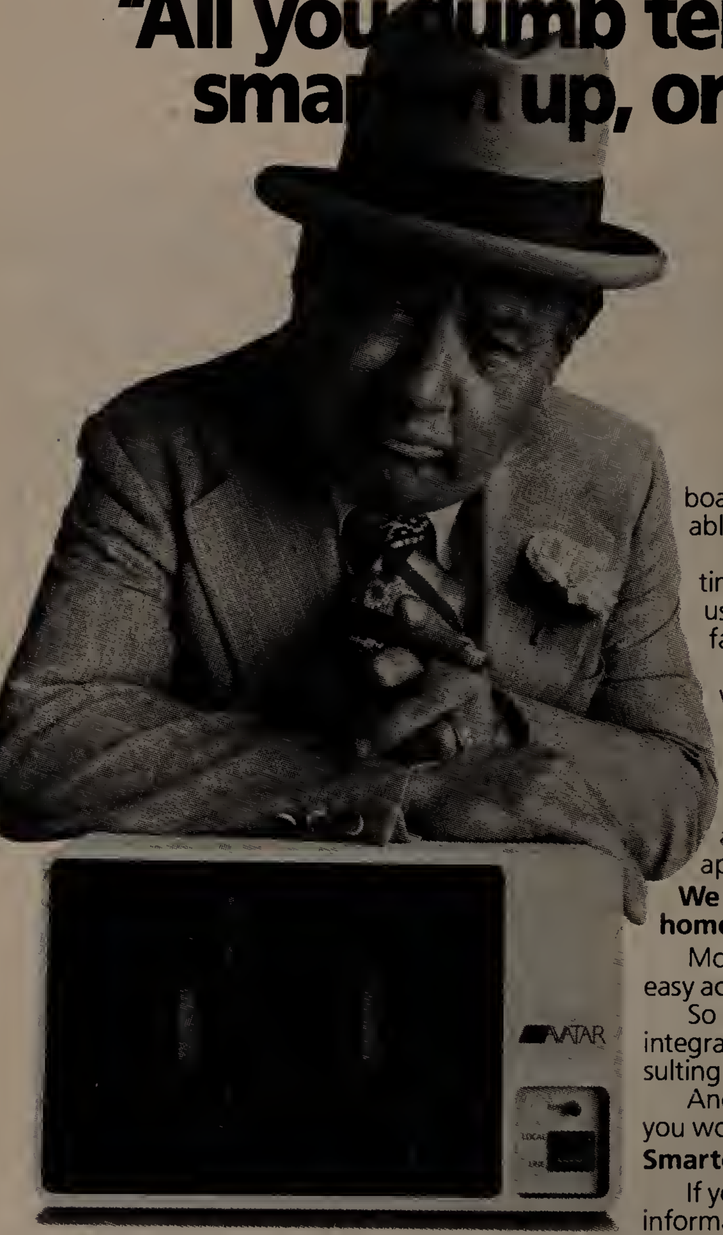
Apples Get 'DSI-A306'

MOUNTAIN VIEW, Calif. — Davong Systems, Inc. (DSI) has announced a line of hard-disk expansion systems for the Apple Computer, Inc. Apple III.

The DSI-A306, with 5M bytes formatted or 6M bytes unformatted, costs $1,995; the DSI-A312, with 10M bytes formatted or 12M bytes unformatted, costs $2,495; and the DSI-A319, with 15M bytes formatted or 19M bytes unformatted, costs $2,995.

Davong is located at 1061 Terra Bella Ave., Mountain View, Calif. 94043.

"All you dumb terminals: smarten up, or else."



Announcing Avatar™ TC1, the first Universal Terminal Converter: turns any dumb terminal into a desk-top computer in minutes. And saves money while doing it.

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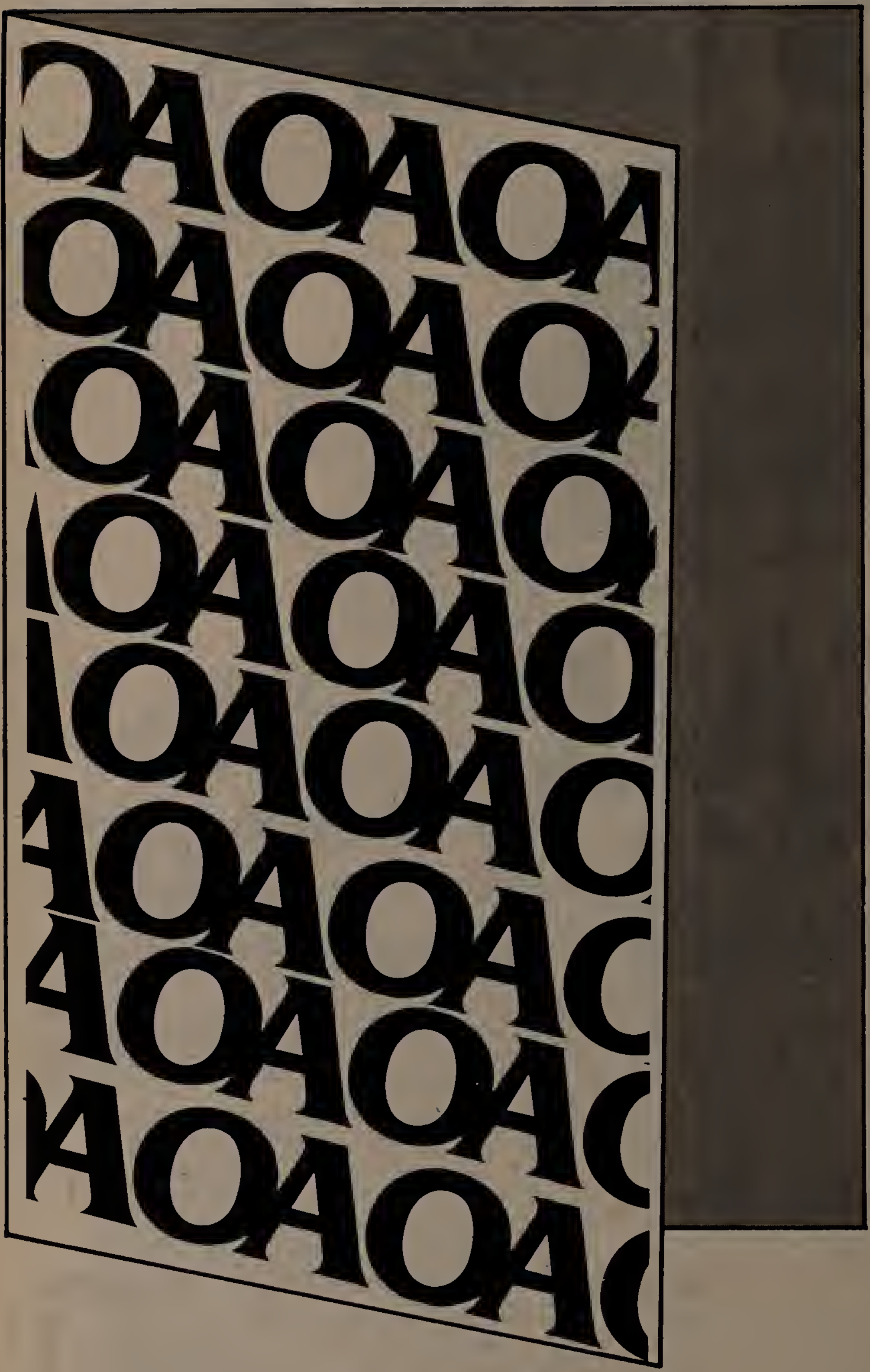

The next issue of *Computerworld OA* will focus on selling office automation within an organization. This special report will feature the human angle of office automation and highlight the strategies of selling the concept of OA to top management and end-users in an organization. You'll see articles on implementation techniques, feasability studies, human interface, ergonomics and productivity.

And, of course, you'll see several articles on current happenings in all aspects of OA.

There will be bonus distribution of this issue to attendees of the Info '82 Show in New York this October.

The issue date is September 29th.

For more details on *Computerworld OA* and the people who read it, just contact your local *Computerworld* representative, or call Bob Ziegel, Vice President at (617) 879-0700 for all the information.

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What Do Secretaries Want in a Workstation?

By Tom Henkel
CW Staff

SAN JOSE, Calif. — A big screen. High-quality printing. Communications with a host processor. Multitasking and local processing capabilities.

Those are features that secretarial workers would like to see in a workstation, according to a recent study IBM made of personnel at its San Jose Research Center here.

The authors of the study — Cristine V. Bullen, who is with MIT's Center for Information Systems Research, and John L. Bennett and Eric D. Carlson, both located at IBM's San Jose Research Laboratory — evaluated how the secretarial staff at the IBM research facility use workstations. They presented their conclusions in one of five office systems papers in the current issue of the *IBM Systems Journal*.

The researchers used an evaluation method called the Office Analysis Methodology (OAM), developed at MIT. The OAM was designed to explore office automation issues at various types of organizations, such as manufacturing, high-technology and service industries, according to the report.

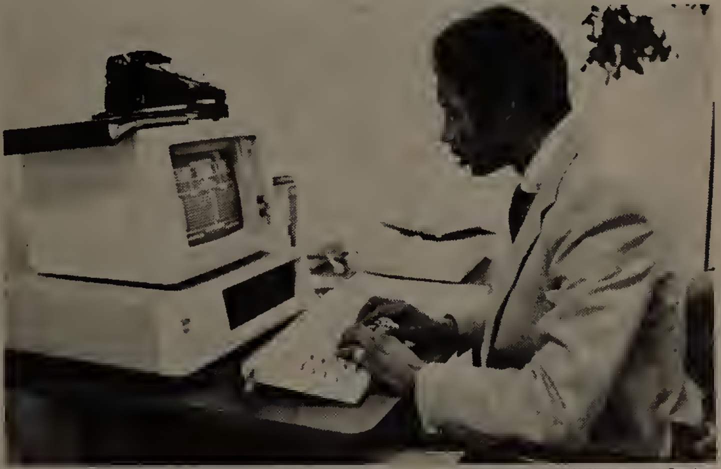
The study reveals the major complaint secretaries lodge against their workstations is that they are not given enough formal training in how to use them. And the secretaries said self-education takes too long.

"[Secretaries] recalled their first days using the system with some sense of accomplishment, but they did not think it was an efficient way to learn. They were also frustrated in that they suspected the system contained a number of additional features that they would find valuable, but they had no easy way to confirm this," the study said.

In addition, secretaries said that because of poor documentation, they often had to rely on word of mouth to learn about new features. Likewise, lunchroom gatherings, as well as other

(Continued on Page 96)

H. Alfred Colby, senior vice-president of DP, confers with Diane Capstaff, Hancock's director of office of the future.



CW Photos by J. Bartimo

Vernon Skipper, Hancock's director of office automation, evaluates the IBM Personal Computer.

Must Maintain Compatibility Standards

Hancock Tries to Stay On Heels of WP

By **Jim Bartimo**
CW Staff

BOSTON — The one problem facing John Hancock Mutual Life Insurance Co.'s office automation effort has been keeping up with the demand for word processing, according to Diane Capstaff, the firm's director of office of the future.

With a mixed shop of predominantly IBM and Digital Equipment Corp. data processing equipment and predominantly Wang Laboratories, Inc. word processing equipment, the sprawling, worldwide insurance company has to maintain certain compatibility standards, added H. Alfred Colby, senior vice-president and DP head who works closely with Capstaff.

"There's a danger in an organization this size of losing control, and then you won't be able to connect [the hardware] later on," Colby said. "People who want word processing have to go to Diane.and have a study done before it can be installed." An IBM Systems Network Architecture (SNA) requirement must also be met.

The office of the future at John Hancock began with a study, according to Capstaff. "A couple of years ago, we were looking at the demographics and found we won't be able to find the people we'll need by the end of the decade," she said.

The decision to automate certain jobs for the future did not eliminate jobs in the present, Capstaff said, but some jobs were upgraded. Job grades one and two — lowest on the personnel ladder and once plagued by high attrition and temporary help — have been eliminated completely. Those jobs are now part of other higher level positions that are assisted by automation and are more meaningful, Capstaff said.

"Our approach has been very different," she noted, "We had a seminar on how the office of the future would effect [the clerical] people. We did that before we went to the senior people. The secretaries knew about it first."

Before installing four Wang VS minis, secretaries tested other systems, "because they were the ones who would be working on them every day," Capstaff said. A training department for new and promoted employees was also established that has been reported to be working double shifts with two instructors.

"We've done a lot on the semi-professional level," the director continued, pointing out that people at the secretarial level now have career paths to programming in the DP department or other related areas in office automation.

(Continued on Page 96)

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Study Probes Secretaries' Needs

(Continued from Page 95)

social situations, are often forums to pass on warnings about flaws in the system, according to the study..

Printer problems are another pet complaint among IBM secretaries, according to the report.

Specific complaints include: the printer is located several hundred feet from the secretarial work area, it is not safe to print personal or confidential text on a semi-public printer and paper-loading techniques are difficult while restrictions on the type of paper stock complicate the secretaries' jobs.

Terminals, too, received some disfavor. Secretaries said it is difficult to proofread text on CRT terminals and the terminals take up too much space on their desks, according to the study.

In spite of some complaints, the study reveals IBM secretaries overwhelmingly preferred office automation technology to manual methods.

"At the San Jose Research Laboratory, we did not see any reluctance to use new technology," the study stated.

"Obviously, the high-technology environment has a significant influence in creating an atmosphere for acceptance." In addition, the study concluded, given the somewhat demanding work load on secretaries at IBM, they would be "hopelessly inundated with work," without some form of automation.

Keeping Up With WP

(Continued from Page 95)

The DP department maintains a number of applications that overlap with some OA applications, such as graphics. It also assists the office of the future with an information center, Colby explained.

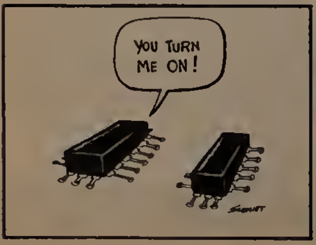
One example of DP support for OA is when the same letter is sent to a number of policy holders. "We can write part of the letter on the Wang system and go into the IBM mainframe for the names and addresses," Colby said.

Upper management has long been exposed to automation but is only now toying with a handful of Apple Computer, Inc. and IBM micros. Word processing, photocomposition and other print-related systems vital to an insurance organization are in the hands of 200 to 300 workers, but Capstaff admits that automation has yet to reach middle management.

"We're hoping that will change with the introduction of electronic mail," which is still under study by her department, she said.

Another development pegged for the future is word processing for the 500 field locations around the world that are now linked to the office here via SNA.

Capstaff's group is in charge of servicing the company by acting as an OA consultant to the other departments. Both she and Colby answer to the same vice-president for corporate operations who in turn answers directly to the president of the company, Colby said.


YOU TURN ME ON!

Management Package Out For CPT's 8500 WP Units

MINNEAPOLIS — CPT Corp. has announced Target Task, a project management package for the firm's 8500 series word processing units.

The package reportedly allows a business to plan and adjust a product schedule in order to meet a required completion date or to match an exacting budget. Features include the ability to review time and cost factors as well as project duration.

The package is capable of handling projects with up to 350 tasks, the vendor said.

The package costs $330 from CPT at 8100 Mitchell Road, P.O. Box 295, Minneapolis, Minn. 55440.

DP Function Available for IBM Displaywriter

RYE, N.Y. — IBM has announced licensed programs that enable users of its Displaywriter office system to develop and run data processing applications.

The DP function for Displaywriter is provided by the UCSD P-System, a complete user-oriented operating system. The marketing rights for the UCSD P-System have been acquired from Softech Microsystems, Inc. of San Diego, Calif.

The system features the Runtime System, said to allow users (even those without programming experience) to run prewritten applications programs. Also featured is the Development System for writing new applications programs in several languages, including Basic.

The UCSD. P-System requires no additional hardware beyond an IBM Displaywriter with 128K bytes or more of memory and a dual-drive diskette unit.

Licensed programs will be available on diskettes in December. The Runtime System is available for a one-time charge of $375.

The Development System is available for a one-time charge of $950.

For HP 3000

'Speededit' Gets Enhanced Version

IRVINE, Calif. — Bradford Business Systems, Inc. has announced an enhanced version of its Speededit screen editor for Hewlett-Packard Co. HP 3000 systems.

The enhanced package has added features to handle office automation functions such as electronic mail, tickler files, room and equipment scheduling, mathematics functions and general text-editing and program-development functions.

The package reportedly allows HP 3000 users to edit, compile and check syntax on Cobol I, Cobol II, Fortran, RPG and Pascal programming languages.

The office automation features allow users to send, list, receive and review messages from other users on the system, the vendor said.

The package costs $3,500, and a demonstration tape is available for $100, the vendor said. Bradford is located at 4920 Barranca Pkwy., Irvine, Calif. 92714.

Project Links Mail Systems At Colleges

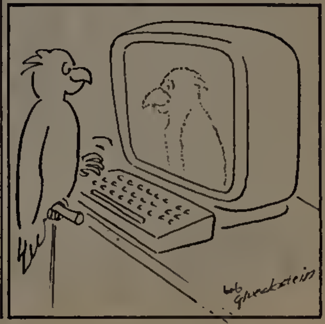
PRINCETON, N.J. — The Carnegie Corp. has approved funding for the pilot phase of a project that will link local campus-based electronic mail systems at colleges and universities.

Called Mailnet, the project is a joint effort of Educom/Edunet, MIT and 15 participating institutions aimed at creating a technically sound intercampus electronic mail system.

Educom is an interuniversity communications council. Edunet is an international computing network and a subsidiary of Educom.

With Mailnet, users will be able to send and receive messages and files via terminals connected to their campus's existing electronic mail system. Hardware and software on MIT's central computing facility will act as an electronic hub for the transfer of messages between campuses.

More information on the network is available from Elizabeth Kilcoyne at Edunet, P.O. Box 364, Princeton, N.J. 08540.



8000 family spells OEM success.

Zilog's System 8000 is a growing family of totally compatible general purpose 16-bit microcomputers designed for high performance and reliability. Priced from $13,000 to under $40,000, they are rapidly becoming the choice of successful OEM's for a growing variety of applications.

The entry level Models 10 and 11 give you 256 KB of parity memory, and an 18 MB Winchester disk for on-line storage. They support up to eight users, making them the perfect low-cost micros for commercial users.

For higher performance, choose the Model 21. It features 1 MB of ECC memory, a 32 MB Winchester disk and a 17 MB cartridge tape for backup.

For the highest performance of all, select the Model 31, the remarkable micro comparable in performance to minis, yet priced far less. It delivers up to 4 MB of ECC memory, plus up to 320 MB of SMD compatible disk and offers an optional 9 track tape. Model 31 also supports up to 24 users simultaneously.

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SYNAPSE N+1, SYNTHESIS, SYNAPSE EXPANSION ARCHITECTURE and APPLICATION DICTIONARY [illegible]

CDC's Applications Center for Manufacturing in Waltham, Mass., offers a variety of systems and consulting services.

CDC Opens Center; Features Manufacturing Applications

WALTHAM, Mass. — Control Data Corp. has opened its first manufacturing applications center here.

Although the center was ostensibly set up for casual use of the company's manufacturing applications, it is "tightly coupled to CDC's sales effort," explained Alan Christman, CDC's general manager of manufacturing industry marketing. Sales of computer-aided design and computer-aided manufacturing (CAD/CAM) systems tend to have a long decision cycle and are dependent on the efficient use of the system, Christman maintained.

Discussions by industry experts at recent conferences on graphics and CAD/CAM have highlighted the fact that CAD/CAM systems are not being used with maximum efficiency. Christman noted that a recent survey by a market research firm indicated that 60% of the CAD/CAM users polled would purchase systems other than the ones they are currently using.

Consequently, if users have an opportunity to become comfortable with the capabilities of such systems with minimal capital outlay, they are more receptive to installing them on-site.

(Continued on Page 100)

Intel to Provide IBM With 2164A Technology

SANTA CLARA, Calif. — Intel Corp. has entered into an agreement to provide IBM with all circuitry, masks and process technology for the 64K Intel 2164A random-access memory (RAM) chip.

Although the firms did not discuss the specific terms of the agreement, IBM reportedly is considering using the Intel 2164A chip technology at its semiconductor plant in Burlington, Vt.

The firms refused to say whether the arrangement carried the promise of future chip production business for Intel. However, "you might surmise that is the case," one observer said.

IBM, one of the world's largest chip producers, manufactures its own 64K RAMs for use in its 4300, 8100 and System/38 processors.

The arrangement is an endorsement of Intel's Hmos D3 technology, a company spokesman said. Intel's 64K RAM is said to be about twice as fast as the IBM 64K RAM. The 2164A also features redundancy — duplication of critical features of the chip that reduce failures and increase reliability. IBM uses this feature in its chip.

IBM considers the technology complementary to its own products, which use Samos technology, the Intel spokesman noted.

In the past, the Japanese have dominated the 64K RAM market, securing an estimated 70% to 80% share of that market. However, the Japanese vendors' market share is expected to drop to about 50% this year.

Intel expects to ship several million 64K RAMs to various customers this year.

Datapoint Earnings Down to $2.4 Million From Last Year's $48.7 Million

SAN ANTONIO, Texas — As expected, Datapoint Corp. reported precipitously lower earnings for fiscal 1982.

The company reported earnings of $2.4 million or 12 cents per share for fiscal 1982 compared with earnings of $48.7 million or $2.45 per share last year. Revenues totaled $508 million, up from $449 million in 1981.

Datapoint Chief Executive Officer Harold E. O'Kelley said fourth-quarter orders continued to be weak, reflecting the general economic situation. He also noted that additional receivable and inventory provisions were made during the final quarter.

For its fourth quarter, Datapoint reported earnings of $3.3 million or 16 cents per share on revenues of $140 million compared with earnings of $13.4 million or 66 cents per share on revenues of $121 million in the same quarter of fiscal 1981.

The financial results reflect the fully consolidated accounts of Flex, Inc., the holding company that owns Inforex, Inc.

Cost-Cutting Moves

During the past several months the firm has made several cost-cutting moves, among them closing a plant in Waco, Texas, and laying off management and system support personnel at headquarters and at various regional offices. [CW April 5, April 19].

Adding to its financial woes, Datapoint is currently in the throes of several stockholder suits against the company, its directors and auditors, alleging misrepresentations in connection with the issuance of financial statements and disclosure of the firm's financial position over the past two years. Those suits also allege insider stock-trading activities. Originally there were 16 suits, but many of these have been consolidated, according to a company spokesman. The litigation is still in preliminary phases, he said.

These developments resulted in the resignations of five marketing executives in May

(Continued on Page 100)

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Executive Corner

- Martin S. Albert has been promoted to president of Cambrian Systems, Inc.
- Robert C. Coolidge has been promoted to president and chief marketing officer for Shasta General Systems, Inc.
- Edwin L. Hughes, president and chief executive officer of Florida Data Corp., has been elected chairman of the board.
- Richard Canfield has been named vice-president of manufacturing at Datamac Computer Systems, Inc.
- Jim Nakasuji has been promoted to senior vice-president and Beau Vrolyk to vice-president of marketing for Codata Systems Corp.
- Dudley F. Clark has been named senior vice-president of development; John B. Landry, senior vice-president for research and development; and Thomas W. Keown Jr., vice-president of the Human Resources Division at McCormack & Dodge Corp.
- Donald L. Miller has been promoted to vice-president of sales for Graphics Technology Corp.
- Joseph G. DiGiacomo has been named vice-president of Unix product development for the Computer Technology Group.
- William O. Ostler has been named vice-president of finance for Pyramid Technology Corp.
- E.D. Garver has joined Radnor Information Services, Inc. as vice-president of marketing.
- Frank Zurcher has been appointed vice-president and general manager of Televideo Systems, Inc.'s Computer Systems Division.
- Bronson H. Purdy Jr. has been named vice-president of corporate marketing for Microdata Corp.
- Carle Robbins has been promoted to vice-president of sales for Olympia USA, Inc.
- Robert G. Kaseta has been elected vice-president of engineering of Vermont Research Corp.
- Robert L. Plouffe has been named executive vice-president of Planning Research Corp.'s Government Information Systems.
- Louis Palmer has been promoted to vice-president of staffing at Information Industries, Inc.
- A. Dale Hiatt has been named vice-president of manufacturing at Quantum Corp.
- James J. Hawkins has been selected vice-president of sales and marketing for ECS Telecommunications, Inc.
- Robert A. Sternberg has been named chief operating officer at Sidereal Corp.
- Kenneth J. Simmons has been appointed vice-president of research and development for Wilson Laboratories, Inc.
- Ross Trenholm has been named vice-president of field services at Software International Corp.
- Michel A. Cholet has been appointed vice-president of Pacific Bancorporations's integrated network services.
- Harold W. Miller has been elected vice-president and group executive of ITT Telecom North America.

Earnings Dip At Datapoint

(Continued from Page 99)

[CW May 24].

"It would be foolish to pretend the short-term morale of the work force has not been affected by the negative publicity," said Vince Balhorn, vice-president and group executive of the Operations and Service Group, during an interview prior to the release of the firm's financial results.

Despite these difficulties, Balhorn said that he did not foresee any dramatic structural changes in the organization.

In August, the firm divided its product lines into communications and office and computer systems, creating two executive vice-presidential slots for those business areas.

Daniel A. Hosage is the executive vice-president for communications management products. Lawrence Seligman, formerly with Data General Corp., was recently named executive vice-president of office and computer products.

CDC Center Opened

(Continued from Page 99)

Ideally, firms considering such purchases would use the center for a couple of months and then have a workstation installed for a few months.

The center features a number of rooms that are outfitted with workstations to perform CAD/CAM applications.

The applications center features the availability of more than 100 industry-specific applications that are tied into CDC's Cybernet services network.

System Was Key

Although the concept of the center has been on the drawing board for quite awhile, the introduction of the company's Integrated Computer-Aided Engineering and Manufacturing (Icem) software system last November was the key to starting the innovative marketing tack, according to Christman.

Much of the software included in the Icem package had been available prior to that time, but had not been integrated.

CDC is testing the waters with the initial applications center here, which is housed in the firm's regional sales office.

Other Centers

The company also has a center for petroleum applications in Houston and another one for as-yet unspecified applications in Sunnyvale, Calif.

The basic charge for use of the workstation is $50 per hour, with additional charges for consultation, according to CDC.

Further information can be obtained from the firm, which is located at 60 Hickory Drive, Waltham, Mass. 02154.

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	LA120 DECwriter III KSR	2.295	220	122	83
	LA120 DECwriter III RO	2.095	200	112	75
	LA12A Portable DECwriter	2.950	280	155	106
	VT100 CRT DECscope	1.695	162	90	61
	VT101 CRT DECscope	1.195	115	67	43
	VT125 CRT Graphics	3.295	315	185	119
	VT131 CRT DECscope	1.745	167	93	63
	VT132 CRT DECscope	1.995	190	106	72
	VT18XAC Personal Computer Option	2.395	230	128	86
TEXAS INSTRUMENTS	TI745 Portable Terminal	1.595	153	85	58
	TI765 Bubble Memory Terminal	2.595	249	138	93
	TI940 CRT	1.795	173	96	65
	TI785 Portable KSR. 120 CPS	1.795	173	96	65
	TI787 Portable KSR. 120 CPS	2.195	211	117	80
	TI810 RO Printer	1.695	162	90	61
	TI820 KSR Printer	2 195	211	117	80
LEAR SIEGLER	ADM3A CRT Terminal	595	57	34	22
	ADM5 CRT Terminal	645	62	36	24
	ADM32 CRT Terminal	1 165	112	65	42
C-ITOH	CIT-101 CRT	1.525	147	82	55
	CIT-161 Color CRT	2.675	257	143	97
	CIT-427 Color Graphic CRT	3.095	297	165	112
TELEVIDEO	910 CRT Terminal	650	62	36	24
	925 CRT Terminal	850	82	46	31
	950 CRT Terminal	1.075	103	57	39
NEC SPINWRITER	Letter Quality, 7715 RO	2.695	259	144	98
	Letter Quality, 7725 KSR	3 195	307	171	115
GENERAL ELECTRIC	2030 KSR Printer 30 CPS	1.195	115	67	43
	2120 KSR Printer 120 CPS	2 195	211	117	80
EPSON	MX-80 F T Printer	745	71	42	27
	MX-100 Printer	895	86	48	32
TIMEPLEX	E0400 4 Channel Stat Mux	1.525	147	82	55
	E0800 8 Channel Stat Mux	2.050	197	110	74

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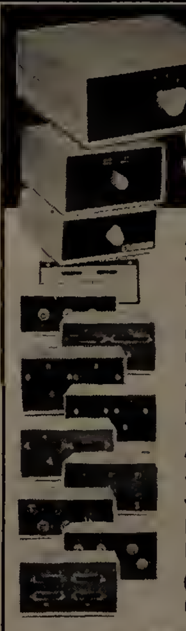

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Supershorts

General Instrument Corp.'s new satellite systems unit will be responsible for the design, manufacture and marketing of all satellite-related products. The unit, based in Toronto, Canada, will focus initially on dish antennas, low-noise amplifiers and receivers.

— — —

GTE Satellite Corp. has started construction in Los Angeles, Chicago and Houston on earth stations for its satellite communications system. The stations are scheduled to become operational in November and will provide voice and data transmission between these cities and, early in 1983, with New York.

— — —

Harris Corp.'s Telephone Systems Division annnounced that 11 of its digital-switching systems are now operational as key communications-routing processors in the Starnet Corp. voice/data network. The switches are connected to seven RCA American earth stations.

— — —

International Telephone & Telegraph Co. has named Dr. Charles K. Kao its first ITT executive scientist, a post created to recognize individuals for outstanding scientific contributions. Appointment of an ITT executive scientist is permanent and for a five-year period appointees will be free to work at an ITT laboratory or unit of their choice in areas which are likely to lead to technological breakthroughs. After the five-year period, they will be assigned responsibilities commensurate with their stature and expertise. Kao, a specialist in optical-fiber communications, will help with the planning and management of basic research at ITT and with univeristy research and development programs sponsored and financed by ITT.

— — —

General Automation, Inc. has consolidated its worldwide computer business into a single operating unit, the computer group. The move will assure a worldwide orientation in product planning and marketing and improve coordination and communications, according to the group's general manager, Richard Cortese, as well as provide more effective planning and control.

— — —

United Telecom Computer Group's United Information Services, Inc. has formed a new business unit, the Professional Services Organization (PSO). PSO will be located in major cities and will focus on consulting, application system design and analysis, custom/contract programming and education and training.

— — —

Quantum Corp. has completed an international distribution network that will serve Australia, Denmark, England, Finland, France, West Germany, India, Ireland, Israel, Norway, Scotland, South Africa, Sweden and Switzerland and a repair-depot facility to support the European distributors and customers. The repair-depot facility is located in England and will handle the full range of Quantum disk drive repairs and service.

To T/S Customers

XCS Now Marketing Xerox's 820-II Micro

LOS ANGELES — Xerox Computer Services, Inc. (XCS) has begun marketing Xerox Corp.'s 820-II personal computer to its time-sharing customers.

The linkup allows Xerox's personal computer to communicate with the service bureau's mainframe, serving as an intelligent terminal. The user can run sophisticated manufacturing, distribution and financial systems through the units or disconnect the link and operate it for word processing or spreadsheet applications, XCS said.

Describing the thrust of the program, XCS Vice-President of Marketing Robert Foster said installing the desktop permits an increase in flexibility to the user, offering better price-performance options in delivering XCS' on-line services.

The 820-II can be attached to the XCS network as a single station on a 300, 1,200 or 2,400 bit/sec communications line. XCS said it would also offer the option of linking up three desktop units to a single 2,400 bit/sec communications line. With this configuration, the 820-II reportedly can simultaneously execute data entry, spooling of reports to the disk and printing of reports from the disk.

XCS is offering the system on both lease and purchase plans.

New Companies

The Harnish Group is a consulting firm providing technical and management services in the development of systems and services using broadcast teletext and videotex. The firm is in Columbus, Ohio.

Police Data Systems has developed turnkey systems for police management information and computer-aided dispatch. Police Data Systems is located at 6500 Dublin Blvd., Dublin, Calif. 94568.

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Broadmoor Group Investing In Computer Ventures

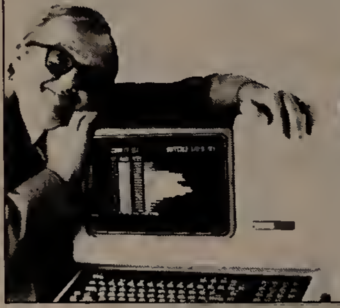
ST. LOUIS — Venture capitalists are not the only ones infatuated with high technology these days. The Broadmoor Group here, the nation's fifth largest builder of apartment complexes, is prepared to invest "tens of millions" in computer ventures.

Like its venture-capitalist counterparts, Broadmoor is looking for "the next Apple Computer," according to DP consultant Steven Epner, whose consulting company, The User Group, is helping the real estate firm screen venture opportunities.

With the real estate market in a tailspin, Broadmoor's president, Joe Morrissey, is ready to put millions into the computer industry. The company is placing advertisements in various trade journals and *The Wall Street Journal* to locate entrepreneurs.

Epner said Broadmoor hopes to evaluate proposals over the next couple of months and begin investing funds in the near future.

Interested parties can submit a business plan to The User Group, 443 N. New Ballas Road, St. Louis, Mo. 63141.



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Now Serves as Chairman

Yourdon Steps Down As President

NEW YORK — Edward Yourdon, president of Yourdon, Inc. for the past eight years, is turning over the presidency of the company to Herbert Morrow, the firm's executive vice-president and marketing director.

Yourdon said he will serve as the firm's chairman, overseeing strategic planning and new product development for the DP consulting, training and publishing firm.

Founded in 1974, the firm currently employs 150 people and has revenues of about $10 million.

Yourdon said he plans to work on ideas for three book, among them software engineering, the cottage industry movement in DP and computing for children.

In addition, he said he hopes to increase the scope of the company's consulting business over the next couple of years.

Right now the company has a heavy concentration in training and seminars with emphasis on structured programming and design. However, he said the company will develop new training programs such as those geared to entry-level personnel.

Edward Yourdon

Herbert Morrow

Mergers & Acquisitions

Systematics, Inc. has reached an agreement in principle to purchase **St. Joseph Systems, Inc.**, of South Bend, Ind., a data processing software firm.

Megnex Corp. of San Jose, Calif. has been purchased by **Ching Fong Investment Co., Ltd.**, of New York.

Omintec Data, Inc. of Phoenix has been acquired by **Heede Industries**, a Greenwich, Conn., investment and management firm.

Burroughs Corp. has acquired **Midwest Systems Group, Inc.**, a specialist in higher education and kindergarten through grade 12 computer programs. The firm will be operated as a division of Burroughs.

Visual Technology, Inc. has reached and agreement in principle with **Caesar's World, Inc.** to acquire Ontel Corp. from Caesar's World for an undisclosed amount, subject to approval of the boards of directors of both companies.

Irwin Olivetti, Inc. is a new organization established by a merger between **Irwin International, Inc.**, Ann Arbor, Mich.; and **Olivetti O.P.E.**, Tarrytown, N.Y. **Ing. Olivetti & Co. S.p.A.**, Ivrea, Italy, holds a 35% interest in the firm.

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STRATUS VS. TANDEM

(Or how the hardware fault tolerant solution supersedes the software based solution.)

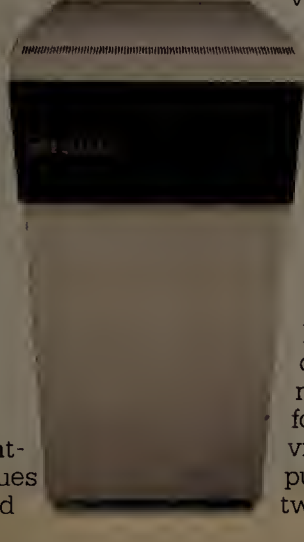
> *"If you drive down the cost of physical hardware, you can make typically redundant paths for less money. Not surprisingly, most redundancy breakthroughs that will occur happen in hardware rather than in software.*
>
> *You can build a double computer inside one box for less dollars, as opposed to doing it in software, which continually needs maintenance and revision, as well as improvement."*
>
> by Aaron Goldberg
> of IDC which
> appeared in *Computerworld's*
> December 28, 1981 issue.

Now that the computer age is in full stride, 100% availability is fast changing from a luxury to a necessity. Downtime and its costs are unacceptable, especially when there is an alternative. Now that fault tolerant operation is becoming a universal requirement, there is demand for an improvement over the software approach used by Tandem. These computers must provide better performance, be easier to use, be easier to program and re-program, be less complicated and less expensive. We believe that the Stratus hardware based fault tolerant system answers these demands. Let us explain.

Why more hardware is better than more software.

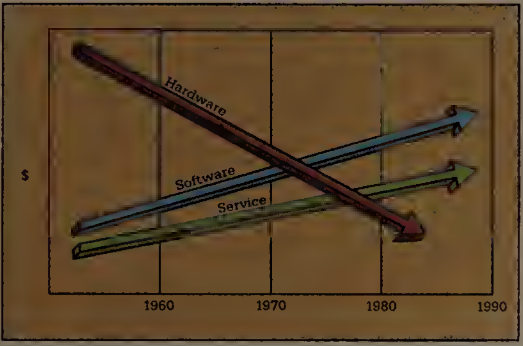
The crux of the problem with software based systems is that they require complex, performance stealing software to provide fault tolerant operation. This software robs the system of precious resources because it uses processing cycles to pass status and checkpoint information back and forth between two computers. What's more, this passing of information can occur at four levels: operating system, user program, file management, and terminal control.

Stratus, meanwhile, has eliminated all this reliability software by having duplicate hardware components tightly coupled, dedicated to performing the same tasks at the same time. It's like having two computers in one, rather than two separate computers. Checking hardware logic detects errors with no performance loss and stops failing components instantly. The duplicate partner continues without interruption, unaffected by the failure. This is all transparent to the programmer and the user. With Stratus, there is no performance or data loss when there is a failure, no operator intervention, and no special programming.



STRATUS/32 – SYSTEM HIGHLIGHTS

1. A simple hardware solution to fault tolerance that totally eliminates the need for extra application design and additional programming.
2. A design without performance penalties for fault tolerant operation – NO CHECKPOINTING!
3. A computer that pinpoints and isolates its failures, so repair is made quickly and inexpensively.
4. A system that can expand to 32 Fault Tolerant Processing Modules under a "single system image."



While software costs will rise because they are people dependent, experts agree that hardware costs will continue to fall.

Why Stratus is easier to implement.

The Stratus designer and programmer might as well be dealing with a conventional computer; one of them, not two.

Programmers are in a familiar environment. By providing industry standard languages, applications can be moved over without redesign or major reprogramming. Fault tolerant operation is a bonus, not a complex effort.

Since there is no checkpointing with the Stratus hardware based solution, the applications designer and programmer is never concerned about overhead for fault tolerant operation. They view the system as a single computer; unconcerned that there are two computers running together.

$130,000 – Software included.

The Stratus concept could not have been executed 10 years ago, 5 years ago, or even 2 years ago. It is possible now because of the dramatic price drop of hardware components. Because of this lower cost of hardware, and because of the simplicity of its architecture, Stratus can offer Continuous Processing™ at a price competitive with traditional systems that don't offer this capability. A fully duplexed configuration with 2 megabytes of memory, peripherals, and software can be purchased for under $130,000.

Don't overlook our software.

To complement our hardware approach to Continuous Processing we have an impressive list of software. For instance: Virtual Operating System (VOS), Transaction Processing System (TranPro), Data Management System, CRT oriented command language, Cobol, Basic, PL/I, Fortran, Pascal, Networking using X.25, IBM Communications, full screen editor, symbolic debugger, forms designer and a complete Word Processing package.

If your application requires total reliability, if you are considering any kind of dual-processor configuration or if you're considering Tandem, then you should fill out our coupon or call Nick Bologna, Director of Product Marketing, 617/653-1466.

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17 Strathmore Road, Natick, MA 01760
CW4

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Stratus
CONTINUOUS PROCESSING™

South Africa Experiences Explosion in DP

By Bohdan O. Szuprowicz
Special to CW‡

While industrialized economies of the northern hemisphere continue to stagnate and even their computer industries have begun to show slower growth again, South Africa is experiencing a DP business explosion unprecedented in its history or in many other countries of the world.

The South African computer industry as a whole has been growing at 40% per year — almost exactly as fast as predicted by the country's industry observers at the outset of the 1980s. This explosive growth comes on top of a very healthy average 25% annual expansion that the South African computer industry exprienced during the 1970s and which developed the basis for current growth in demand for hardware, software and services.

IBM South Africa, which is believed to control about 30% of the market, claims to be doing even better than the industry as a whole. According to Tony Dry, IBM South Africa's new marketing director, the company experienced a growth rate of almost 80% during 1981 and its software sales have been increasing at 50% annually.

Profitable Subsidiary

Although IBM does not release any sales figures for its foreign subsidiaries, industry observers estimate that IBM South Africa sales are currently about $200 million annually. This would also make the company one of the most profitable IBM subsidiaries, bringing in about $111,000 for each of its 1,800 employees in South Africa.

While IBM South Africa had always been the leading industry supplier in terms of value of installations and gross revenues, it was challenged during the 1970s by the UK-based ICL, a company that claimed more computer systems installed through most of the last decade.

Last year, however, ICL slipped to third place and was overtaken by Burroughs Corp., which almost matched IBM South Africa in overall sales during 1980.

No doubt such a close call by Burroughs, which is IBM's major American hardware competitor in many parts of the world, must have given IBM South Africa the additional impetus that resulted in its remarkable sales performance during 1981. Since Burroughs does not have a market share comparable to IBM in any other country, this fierce competition is likely to continue for many years.

Top Hardware Supplier

ICL, nevertheless, remains a leading computer hardware supplier in South Africa, and that market is important to the British computer manufacturer. ICL is estimated to derive about 10% of its global sales and about 25% of its non-UK sales from South Africa.

Among all the major mainframe suppliers operating in South Africa today, ICL is believed to be the most likely to establish a computer manufacturing plant in the country, perhaps in the very near future.

Besides the above-mentioned computer suppliers, other manufacturers that already have a market share include NCR Corp., Sperry Univac, Control Data Corp., Hewlett-Packard Co., Digital Equipment Corp., Data General Corp. and Siemens AG.

None of the above controls more than a few percentage points of the overall market, and all are in a very competitive situation resulting from a proliferation of small and microcomputer systems

Directory Lists Service Vendors

MOUNTAIN VIEW, Calif. — The *1982 Directory of Leading U.S. Computer Services Vendors* has been published by Input, Inc.

The directory surveys the activities of 243 U.S. firms with computer-services revenues greater than $10 million. Companies are classified as either DP, software products, professional services or integrated systems vendors.

The book costs $2,000 from Input, 1943 Landings Drive, Mountain View, Calif. 94043.

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Teletype Corporation [illegible]
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With IBM at Forefront, Burroughs Trailing

firms and their representatives or agencies. It seems that given the dire need for programming and systems capabilities, the hardware suppliers who can best provide a solution to that problem will be rewarded with a growing market share in the future.

Ominous Entrant

The latest, and potentially most ominous entrant, however, is Japan, with large-scale, IBM-compatible systems offered through an agency and several personal computer products being readied for entry into the South African market. Japan has a vested interest in developing the best trade climate with South Africa because of its extensive dependence on strategic and critical minerals, many of which are imported in large quantities from South Africa.

One of the probable reasons for the present computer hardware sales explosion in South Africa may be the Reagan administration's decision in March 1982 to relax the four-year embargo on computer hardware and software sales to South African police and armed forces, which protested apartheid policies and supported American human rights policies stressed under the Carter administration.

Under New Rules

Under the new rules, sophisticated computer systems may be granted licenses for export to South Africa's rapidly growing military-industrial complex that includes Armscor, the 10th largest weapons manufacturing organization in the world. Chances are that IBM South Africa, with its superb corporate intelligence, anticipated the embargo relaxation and was well-poised to enter the lucrative markets for large-scale equipment that have grown during the embargo years.

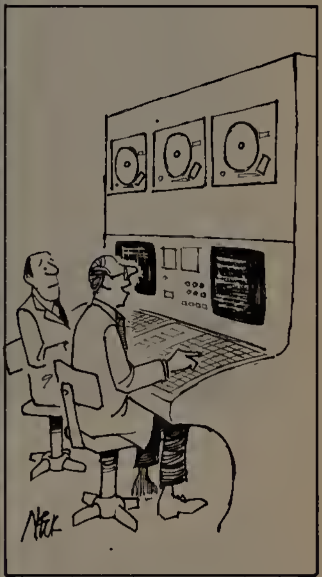
No doubt the same reasons account for Burroughs'extraordinary performance in South Africa; Burroughs also supplies many large-scale sophisticated systems suitable for weapons and systems control.

Personal computers, word processors and small business computers do not require U.S. export licenses, no matter what their destination in South Africa. As a result, this market, which is also growing very fast and offering equipment that is particularly suitable to the small South African firms, will probably be very profitable for the early entrants.

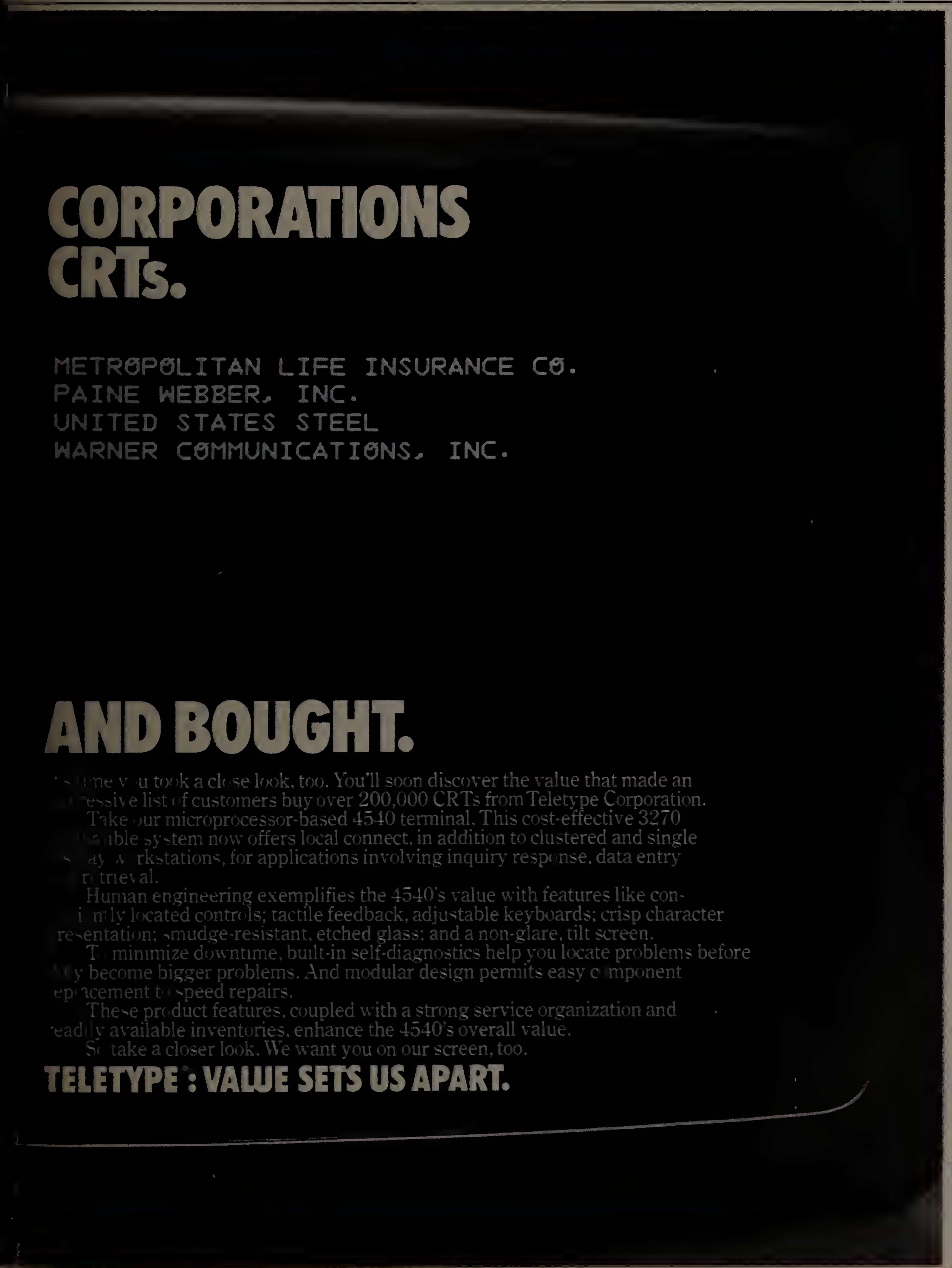
Growing Unrest

On the other hand, there is growing unrest within South Africa as a result of increasing trade union activity, the slumping price of gold, inflationary pressures in the economy and the unresolved question of Namibia. On top of these national problems, the desperate shortage of skilled programming and computer operating personnel is somewhat of a paradox. Social changes designed to bring a much larger proportion of the black population into skilled and supervisory positions in the economy are being developed, but are unlikely to keep pace with the demand in the computer industry — at least for the next 10 or even 20 years.

The South Africans see an accelerated introduction of automation and computers as part of their long-range solution, but this creates immediate demands for DP-skilled personnel that are not available in South Africa.



'They Don't Write Programs Like That Anymore.



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U.S. Service Firms Abroad Not Seen Till Decade's End

WASHINGTON, D.C. — The federal government is increasingly supporting U.S. service industries, including DP and telecommunications, in its efforts to ease business restrictions abroad, but a recent congressional report states that multilateral services/trade negotiations will not bear fruit before 1990.

Various services sectors, particularly telecommunications, information and insurance, have petitioned the administration and Congress for help in fighting barriers to their international operations. There are numerous bills pending in Congress for that purpose, and the executive branch has given services/trade problems high priority.

A new report from the General Accounting Office (GAO), which primarily addresses the insurance industry but which also comments on services trade in general, notes these developments and also pointed to apparently successful U.S. government efforts to raise these services issues within the framework of the General Agreement on Tariffs and Trade and within the Organization for Economic Cooperation and Development.

The GAO agreed "nations are now starting to view barriers to international services trade as an important issue" and that "there is a very good prospect that a services round of multilateral trade negotiations will be undertaken." But, the report said, "negotiations will not likely begin before the mid-1980s nor be completed before the end of this decade."

Contracts & Pacts

Raytheon Data Systems Co. has received initial funding under a $26.4 million contract from the Environmental Protection Agency (EPA) to supply and service up to 2,500 word processor units to be installed at central EPA facilities in Washington D.C., and regional and field offices throughout the U.S.

Science Management Corp.'s Information Systems Division has been awarded a contract to provide general systems and programming support to federal agencies in the Washington, D.C., area. The firm has also received a contract from the U.S. Army to perform a materials system analysis. The contracts have a total value of $8 million to $11 million.

Hallmark Business Systems, Inc. has signed a three-year, $20 million contract with Honeywell, Inc. to market their DPS 6 minicomputers throughout the U.S.

Racal-Milgo Government Systems, Inc. has received a $6.5 million contract from Electronics Data Systems Corp. (EDS) for modems that will be included in EDS' Viable system for the U.S. Army.

Generation Sciences, Inc. has received orders totaling nearly $300,000 from the U.S. Army for three installations of Genasys software and support services.

Commterm, Inc. has signed an OEM agreement to supply Anaconda-Ericsson's Communications Division with voice-store-and-forward systems for integration with Anaconda-Ericsson private automatic branch exchange.

Cipher Data Products, Inc. will provide Sperry Univac with several thousand Microstreamer ½-in. streaming tape drives over the next five years under a contract valued in excess of $12 million.

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Product Set: Memorex® 2079 Display Stations; Models S2A, S2B, S3G, 2X and 3X.

System Interfaces: IBM 360, 370, 303X, 308X, 43XX and 8100.

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Product Specifics: On 2079 Color, Convenience And Comfort. All 2079 models deliver bright, crisp color—color that can be brought up quickly, normally with no special software or controller modifications. Pre-converged color eliminates time consuming manual color alignment. And a host of features further contribute to operator convenience and comfort—like a tilting and removable monitor, a detachable, low-profile keyboard, a recessed sun-flex screen and non-glare keytops and surfaces to reduce eye strain.

On 2079 Versatility And Powerful 2079 Graphics. Five 2079 models, three in standard off-the-shelf configurations and two that can be user-configured, give you maximum versatility and cost efficiency. And with graphics available on both a standard and a configurable model, you can put color to work in dozens of business graphics formats.

On Top-Of-The-Line 2079 Quality And Bottom-Line 2079 Cost Efficiency. The 2079s are designed for economy. They need less power and generate less heat than the IBM counterparts. And thanks to their compact design, they take up less space. But basic Memorex quality is really the best economy—economy that results in more productive and longer lasting operation.

Memorex. The Communications Group. For more information, contact Laurie Schuler at 18922 Forge Drive, Cupertino, CA 95014-0784. Or call toll free to (800) 538-9303. In California, call (408) 996-9000, Ext. 222.

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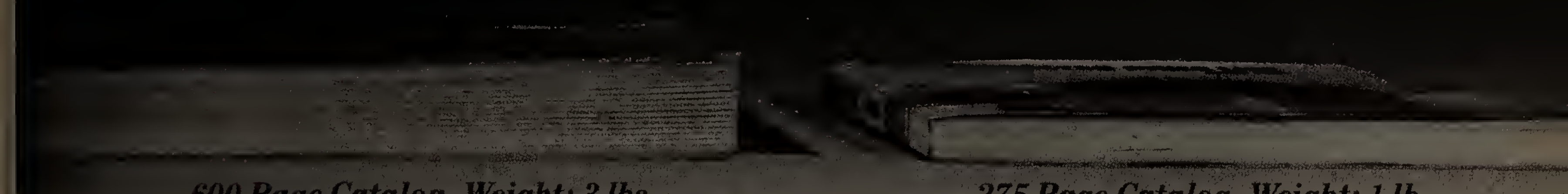

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Nickels & Dimes

AT&T will sell eight million common shares at $57.18 per share to a group of dealers including Morgan Stanley & Co., Inc.; The First Boston Corp.; Goldman, Sachs & Co.; Merrill Lynch White Weld Capital Markets Group (Merrill Lynch, Pierce, Fenner & Smith, Inc.); and Salomon Brothers, Inc. The purchasers will offer the shares to the public. AT&T plans to use the proceeds from the sale for advances to subsidiary and associated companies, for additional equity investment in the companies and for general corporate purposes.

$ $ $

Apollo Computer, Inc. has completed its fourth round of financing, a privately placed offering of $5,000,000. The funds will be used for working capital, according to a company spokeman.

$ $ $

Atlantic Research Corp. has completed an offering of 495,000 shares of common stock at $23.25 per share. Proceeds will be used to repay a portion of the company's revolving credit loan.

$ $ $

Corvus Systems, Inc. has filed a registration statement with the Securities and Exchange Commission for a public offering of 1,800,000 shares of common stock, 1,300,000 being sold by the company and 500,000 by certain shareholders. Dean Whitter Reynolds, Inc. and Montgomery Securities have been named as managers of the underwriting group that plans to offer the shares to the public in late September. Net proceeds will be used by the company for repayment of bank debt, capital expenditures and working capital.

$ $ $

The Prudential Insurance Company of America has reached an agreement in principle with the Southern Pacific Co. to provide a substantial part of the funding for Southern Pacific's communications satellite program. Prudential will invest up to $135 million over a three-year period.

$ $ $

Micropolis Corp. has received $6.6 million in equity from venture capital sources and a $10 million revolving long-term line of credit with the company's principal bank. Names of the investors were not disclosed. The funds will be used for the introduction of new products in 1982.

$ $ $

Lundy Electronics & Systems, Inc. plans to file a registration statement for the offering of approximately 500,000 units of common stock and common stock purchase warrants. Proceeds will be used for additional research and development, equipment and working capital.

Orders & Installations

Honeywell, Inc. has received orders from Jackson National Life Insurance Co. and Middle Tennessee State University for Dual DPS 8/44 systems. The total value of the contracts is $2.5 million.

Sperry Univac has received orders for its System 80 computers from the city of Cambridge, Mass.; the New Jersey Highway Authority; Meltronics, Inc.; Brand Names Sales, Inc.; Metro Computing, Inc.; Delair/Public Leasing; and Cow and Gate, Ltd., a British baby food manufacturer.

On-Line Business Systems, Inc.'s Software Products Division has received an order for its Wylbur systems from Textronix, Inc. The contract is valued at more than $100,000.

RCA Service Co. will provide continued on-site maintenance for American Airlines Sabre system data communications equipment under the terms of a contract valued in excess of $6 million annually.

Datacrown, Inc. will supply computing services and technical support to the National Association of Securities Dealers, Inc. Value of the 18-month contract was not disclosed.

Icot Corp. has received a $2.5 million order from American Airlines for intelligent terminals and associated data communications equipment.

IDC Launches Micro Service

FRAMINGHAM, Mass. — International Data Corp. (IDC) has launched the Micro Systems Marketing Service aimed at micro vendors.

The first product of the service is a report called "Channels of Distribution," which analyzes distribution trends and strategies among vendors and resellers in the micro market.

Other components of "Channels of Distribution" include bulletins, a monthly newsletter, annual census and 5-year forecast of the Desktop Computer Market and complimentary attendance at IDC's 2-day conference in Napa, Calif.

A charter subscription to the report — including a year's worth of related components —costs $9,000 from IDC at 5 Speen St., Framingham, Mass. 01701.

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Digital Communications Associates, Inc., a rapidly growing company in the data communications industry, has openings in the Engineering Department for System Software Programmers. These positions involve the design and implementation of data communications software for DCA's microprocessor-based network processors.

Three to six years experience in real-time assembly language programming are required for these positions. Microprocessor and data communications experience is a plus.

If you have the appropriate experience and would like to explore this opportunity further, either call or write:

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Data Base Analyst

Duties include providing expert knowledge of data base systems during the design of integrated applications and translating system specifications into integrated data base systems. Responsible for reviewing existing systems and future requirements to maintain as well as improve system performance of data base applications. Responsible for data relatability, reliability, integration and standardization. Requires a bachelor's degree in Computer Science or closely related field and a minimum 5 years experience in computer development field with emphasis on data base systems development and design.

Engineering Design Analyst

Responsible for defining integrated on-line systems for engineering design applications with data base systems and providing expert technical assistance in the planning stages of development projects. Consults with users, customers, vendors and Computer Systems staff to specify requirements for graphic systems. Requires a bachelor's degree in Computer Science or closely related field and 7 years experience in the computer development field with emphasis on integrated on-line engineering systems.

Communications Analyst

Position duties include conducting logical analysis of communication requirements and configurations for new system development projects and translating computer configurations into purchase specifications. Responsible for providing technical direction to Computer Systems staff, developing standards for utilization of communication networks and monitoring network performance. Requires a bachelor's degree in Computer Science or closely related field and 7 years experience in the computer development field with emphasis on computer systems communications configuration.

Computer Systems Planner

Position is responsible for developing and translating company-wide systems development specifications into computer systems configurations Involves working closely with systems development staff and computer vendors to ensure that specified performance characteristics are achieved Duties also include determining the cost effectiveness of present and proposed future computer system configurations BS degree in Computer Science or a related field with 7 to 12 years computer systems experience is required Experience should include 3 to 5 years in systems hardware and software planning MS degree preferred

System Design Planning and Analysis

Positions are responsible for providing definition and formulation of solutions to a wide variety of business issues. Responsible for translating solutions into specifications for integrated on-line data base systems. Will survey, define, specify and develop automated systems to support **Braun's** international engineering and construction organization at all levels of management Must have recognized skills to conceptualize, design, manage and implement development tasks. Experienced individuals must have skills in the following areas in developing management information systems:

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  Heavy emphasis in scheduling, material control, cost engineering, estimating and quality control.
- Engineering Systems
  Experienced in problem solving activities necessary to support the following engineering disciplines: civil, mechanical, piping, electrical, instrumentation, chemical and process.
- Business Systems
  Areas of involvement include time distribution, project accounting, manpower projections, workload forecasts and general business
- Field Systems
  Understanding of field site procurement, inventory control, receiving, inspection, scheduling and construction activities.

Senior Systems Design Planners

BS degree in Business Administration, Engineering or Computer Science with a minimum of 8 years combined experience in computer systems and related discipline.

Design Analysts

BS degree in Engineering, Business or Computer Science with a minimum of 3 years experience in designing integrated on-line data base systems

REASONS TO JOIN THE BRAUN TEAM

We offer excellent salaries along with an attractive benefits program. This program includes life, medical, dental and accident insurance, commuter van service, a two-way retirement plan, profit sharing, investment savings plan and more. At **Braun**, our standard workweek is 4½ days with Friday afternoon off.

Send your resume to:

Bob Owiecki
Department CW 0913
1000 S. Fremont Avenue
Alhambra, CA 91802

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Computer Professionals With
Two or More Year's Experience:

Learn About New Opportunities and Where You Might Fit In...

At Source Edp's Computer Career Conference.

$18,000–$54,000+

Call Mike Parr at 1-800-821-7700 x331.

Do you really know if you're in the one best position? Or are there other opportunities that will provide state-of-the-art exposure, more compensation and maximum potential for long-term growth?

The Source Edp Computer Career Conference will help computer professionals evaluate the current job market, find out where they stand and stay in touch with today's dynamic computer field—all in complete confidence. Key information systems executives in your area and across North America will be available throughout the Conference—at your convenience—to explain their long-range plans and where you might fit in.

Over 9,300 New and Exciting Positions.

Firms participating in the Conference represent a broad cross section of user, consulting and service organizations. They are diverse in industry concentration, size and location. Many types of positions are available, and compensation levels are outstanding.

In all, over 9,300 specific positions exist. The Conference offers you a very convenient and productive method of investigating a wide variety of career options—all in complete confidence. There are no forms to fill out—nor is a resume necessary. You will meet only those firms that you are interested in—or that have interest in you. Discussions will be held in strict privacy. There are no fees or forms to fill out. Nor is a resume necessary.

Following is a summary of the kinds of positions and compensation offered.

Applications Programming—$18-$45,000.

Those with two or more year's experience in applications programming will have an opportunity to learn new skills and earn maximum compensation. Positions exist in environments ranging from the largest scale mainframes through mini/microcomputer technology and across virtually all computer manufacturer products. This involves a variety of languages including COBOL, PL/1, Assembly, RPG II, or BASIC; operating systems like OS/MVS, DOS/VS, VM; and data base and data communications like IMS, CICS, TOTAL, IDMS, ADABAS, System 2000, ENVIRON I and more. Significant opportunities exist for those with solid programming backgrounds to move into systems development, software, EDP auditing or systems evaluation.

Systems Development, Consulting, Project Management, EDP Auditing—$25-$54,000.

Many openings exist for persons with systems development or audit backgrounds ranging from Junior Analyst to Senior Project Manager. Experience in manufacturing, finance and/or distribution information systems is particularly valuable. A number of organizations participating in the Conference will offer current Applications Programmer Analysts the opportunity to move directly into systems design projects. Those more senior are sought for Project Manager openings. Many larger organizations who are now planning ambitious expansion programs will provide formal management training and development. Several smaller or intermediate size firms now making their initial thrust into computing—especially in mini/micro areas—are seeking persons to help them develop and oversee new systems technology.

Systems Programming, Software Development, Data Base Systems, Telecommunications, Technical Writing—$24-$52,000.

Those with several years of systems software, data base or telecommunications experience will be able to gain exposure to some or all of the following: OS, VS, MVS, JES3, CICS, IMS, TSO, DL/1, BTAM, TCAM, VTAM, OCR, duplex lines, modems, programmable line concentrators, switches, CRT'S, IBM up to 370/168's, 4341-2's and 3033's, and a variety of non-IBM systems including most types of minicomputers. Assignments range from development and modification to maintenance, support and technical documentation of advanced data base and data communications software, graphics, CAD/CAM and distributed processing. Many firms offer formal training and day-to-day contact with some of the top technical professionals in the country. There are senior software positions available as well as entry-level software positions for Applications Programmers who are strong in OS/BAL.

Marketing—$30-$90,000. Marketing Support—$22-$42,000.

Those professionals who attend the Conference will learn about new opportunities in computer marketing and marketing support. Many alternatives exist in many product areas including mainframes, mini/microcomputer technology, terminal systems, time-sharing, facilities management, proprietary software packages, OEM's, consulting and more. Many firms are just now entering new markets and will provide exceptional career and compensation growth potential.

How to Participate.

The Computer Career Conference is scheduled in a city near you soon. There is absolutely no charge for your involvement or attendance since client companies who will participate will assume all fees.

Simply call Mike Parr today at 1-800-821-7700 x 331. (Those in Hawaii or Alaska, call 1-800-821-3777 x 331). Our lines are open everyday, twenty-four hours. Once we hear from you, one of our professional staff will get back to you about Conference dates in your area.

Call, in Confidence,
Anytime Day or Night
1-800-821-7700 x 331.

If you're unable to call, write:

Mike Parr
Career Conference Director
Source Edp Headquarters
Two Northfield Plaza
Suite 227, Dept. C4
Northfield, Illinois 60093

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North America's largest recruiting firm that specializes exclusively in the computer profession. Client organizations assume our charges

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Home of the famous family of microcomputer software packages, including WordStar®...the #1 selling multilingual word processing software in the world.

You are invited to interview with our R&D managers at your choice of two locations. Come visit us at the Sunnyvale Sheraton...or at our corporate headquarters in Marin County, just 20 miles north of San Francisco.

SUNNYVALE

The Sunnyvale Sheraton
1100 No. Mathilda Avenue
Sunnyvale, CA 94086
Tuesday, September 21st, 5:30 p.m. to 8:30 p.m.

MARIN COUNTY

MicroPro's Corporate Headquarters
33 San Pablo Avenue
San Rafael, CA 94903
Saturday, September 25th, 10:00 a.m. to 1:00 p.m.

The following newly created positions are available at our corporate headquarters in Marin County:

Senior Programmers

Design, enhance and develop business applications software for microcomputers. BSCS or equiv. plus exp. in CP/M, 808X, Assembly, C or PASCAL. Four plus yrs. programming exp. desired.

Team Leader/ Development Technology

Head up a product configuration team and work closely with equipment manufacturers in configuring software packages for pre-production released computers. Six yrs. programming plus some supervisory exp. desired.

Project Manager/ Text Processing

Be responsible for new product specs and follow-through coding. Word processing development, graphics and microcomputer background essential. Ten yrs. programming, including 2 plus yrs. project management exp. desired.

Team Leader/ Data Management

Supervise small programming staff with responsibility for maintenance of DataStar™ and InfoStar™ Six plus yrs. exp. desired.

Stop by our Open House at the location most convenient to you. If you prefer, call (415) 499-1200, ext. 2184 to pre-register. If unable to attend our Open House, please forward your resume to MicroPro International Corporation, 33 San Pablo Avenue, San Rafael, CA 94903. An equal opportunity employer.

MicroPro™
INTERNATIONAL CORPORATION
Creator of **WordStar®**

EDP OPPORTUNITIES *COAST TO COAST*

Robert Half, staffed by EDP professionals for EDP professionals with 60 offices throughout the U.S., Canada & Great Britain, is the largest network of personnel consultants in the Data Processing field. And its establishment in 1948 also makes Robert Half the oldest. One call and you can search the local, national and international markets. All fees are paid by client companies, of course. The following is a partial listing of opportunities and locations:

CHICAGO

Chicago Is Your Kind Of Town...

PROGRAM ANALYST

THIS company is on the move with soaring profits! There is plenty of room for advancement so get in on the ground floor. Your 2+ years of BASIC experience will enable you to work hand in hand with the Chief Financial Officer developing the micros throughout the corporation. Heavy user interface. **$25,000**

PROGRAMMER ANALYST

Meet your future! Challenging assignments working with securities, stocks, bonds. Your strong BAL or Assembler will put you on this team. 60% analyst. CICS and some COBOL required. **$35,000**

On State Street That Great Street...

SYSTEMS ANALYST

Put your talent to work for this internationally recognized giant. Utilizing the latest hrde and DB techniques you will find your working hours flying by. CS. eng or math degree and 4+ years experience with PL1, PASCAL, COBOL, and DB will put you in charge of a team supporting their new and existing product lines. **$40,000**

DP MANAGER

IF you have the desire to be heard this is the chance you've been waiting for. 3+ years on PDP11/70 using BASIC+ and RSTS with a strong business background qualifies you to evaluate and upgrade hardware and software. This company is aggressive and open to new ideas. Light travel. **$28,000**

Each Time I Roam Chicago Is Calling Me Home...

SYSTEMS ANALYST

CAD/CAM specialist. You are needed right now! This company is exploding with business. Requirements: STRONG Assembler, Fortran, MVS operating system, masters in CS You'll be working with the greatest scientific minds of our times. **$40,000**

PROGRAMMER ANALYST

Keep abreast of the technical developments in this manufacturing environment. Background should include COBOL, 1+ yrs CICS, IDMS or IMS, DL1. You'll be working on MRP, shop floor, production control. Career climbing opportunity! **$27,000**

Chicago, Chicago We'll Show You Around.

PROGRAMMER ANALYSTS

5+ years BAL (DOS) Financial applications.
3+ years BAL (OS) Banking applications.
2+ years COBOL and PL1 IMS DBDC Trust applications.
3+ years Fortran — Heavy statistical involvement
$30,000

Your abilities and our contacts can take you a long way.

Sandy White
ROBERT HALF
of Chicago, Inc.
35 E. Wacker
Chicago, IL 60601
(312) 782-6930

HARTFORD

IMS

CT oppty for IMS trained indiv's currently in prog/analyst or sys analyst respons to move into tech support function in expanding data ctr. **$32,000**

SYSTEMS PROG

Nat Blue Chip corp seeking indiv with IBM/MVS tech bkgrd to install all future IBM software prod. **$36,000**

DATA BASE

IMS bus devel exp qualifies for mgmt oppty in directing small tech & devel staff. Ind bkgrd open. Cent CT loc. **$40,000**

SYS MANAGER

Current exp in direct online fin'l apps using CICS qualifies for CT oppty in state-of-the-art. Client exp rapid growth. **$40,000**

TELE-COMM

CT based client seeks IBM TCAM/VTAM indiv's for expanding nat-wide network. Oppty for microwave, satellite transmission studies. **$36,000**

TIMESHARING

IBM VM/370 or CMS training qualifies for CT oppty's to expand svcs in new div's & loc's. Visible user oriented situations offering immed prof growth. **$37,000+**

Stan Durbas
Burt Israel
ROBERT HALF
of Hartford, Inc.
111 Pearl Street
Hartford, CT 06103
(203) 278-7170

BUFFALO

MGR TECH SUPPORT

Proven mgmt ability needed to head up dept in charge of communications networking. Fin'l inst needs people-oriented mgr to organize, plan & handle software telecom. IBM 370 IMS shop. **$35,000**

Bob Collins
ROBERT HALF
of Buffalo, Inc.
1310 Liberty Bank Bldg.
Buffalo, NY 14202
(716) 842-0801

DALLAS

SAUDI ARABIA

Have several positions available. These include mgmt, systems analysis, legal/contract admin, training, database, software and communications. Benefits outstanding. Start date flexible. Salary **open.**

John Staiger
ROBERT HALF
of Dallas, Inc.
Two NorthPark East, #750
Dallas, TX 75231
(214) 363-3300

SEATTLE

DP MANAGER

Requires 5+ years DP, Datapoint experience, COBOL, Databus Good systems analysis and design experience. To **$34,000**

Marjie Peterson
ROBERT HALF
of Seattle, Inc.
600 University St., Ste. 2328
Seattle, WA 98101
(206) 624-9000

BOSTON

SR SYS ANALYST

Growing multi-mil dollar CENT MASS mfr has immed need for seasoned MIS indiv. IBM 4341 DOS/VSE under VM w/CICS, DL-1 & CMS. Hvy user interface in this fast paced EDP shop. Attractive rural country setting **$35,000**

OS/MVS SYS PROG

Leading hi-tech mfr seeks astute & systematic internals pro for major upgrades. IBM OS/MVS, IMS DB/DC environ with highly prof staff. Tech challenging pos w/stepping stone up the mgmt ladder. **$38,000**

IMS PROJ LEADER

Diversified cons svcs firm seeks results oriented pro to lead apps devel team IBM OS/MVS IMS DB/DC shop w/distrib proc network. If you're looking for the leading edge + supportive mgmt. this could be for you. **$34,000**

Gerry Battista
ROBERT HALF
of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200

PROVIDENCE

BURROUGHS 6800 P/A

Major mfg div of Fortune 100 co seeks Burroughs prog/analyst with mfg apps & COBOL programming expertise. Upward mobility for the hi-achiever. Excellent benefits. Near Cape Cod. **$25,000**

Bob Lathrop
Bob Urion
ROBERT HALF
of Providence, Inc.
400 Turks Head Building
Providence, RI 02903
(401) 274-8700

WESTERN MICHIGAN

SENIOR ANALYST

Capable of project management for on-line MRP development. Working knowledge of IBM 370 or 4300, preference for CICS background. Negotiable around $30,000, salary reviews at 6 and 12 months.

ROBERT HALF
of Western Michigan, Inc.
180 N. Division, #302
Grand Rapids, MI 49503
(616) 458-2333

MEMPHIS NASHVILLE

DP MGR

Rapidly growing mfg company has System 38 with plans for another. Company needs manager type that knows the System 38 inside and out. Designing experience from scratch preferred. Bonuses and raises twice a year. **$30,000** range

SYSTEMS ANALYST

Excellent opportunity to join an outstanding corporation. 3 years systems design experience in financial, inventory and merchandising application. Retail experience preferred. Previous COBOL experience helpful. Excellent benefits. **High 20's-Low 30's**

ROBERT HALF
of Nashville
1101 Kermit Dr., Suite 407
Nashville, TN 37217
(615) 361-4900

ROBERT HALF
of Memphis
825 Ridge Lake Blvd.
Suite 350
Memphis, TN 38119
(901) 683-5800

ROBERT HALF

TULSA

PERKIN-ELMER

Large national company is in search of P-E system programmers for the Texas area. Must communicate well with users. Good relocation pkg and super benefits. Salary open

ROBERT HALF
of Oklahoma, Inc.
5840 S. Memorial Dr., #217
Tulsa, OK 74145
(918) 627-1600

PALO ALTO SAN JOSE

SYSTEMS ANALYSTS PROGRAMMERS

Multiple openings exist for professionals with a background in IMS, OS/MVS, COBOL; Banking, Finance, Insurance or Manufacturing applications.

Linde Strickland
Jim Dupre
ROBERT HALF
of Northern Calif., Inc.
2 Palo Alto Sq., Ste. 212
Palo Alto, CA 94304
(415) 493-8700

675 No. First St., Ste 609
San Jose, CA 95112
(408) 293-9040

TAMPA

PROGRAMMER/ANALYST

We have multiple openings for experienced banking pro's Customer service to project leaders — IBM.
Salaries range from **$18,000** to **$32,000**

SYS PROG

Large IBM mainframe — DOS or OS Sysgens-Cobol-Assembler great.
Salary range **$22,000** to **$38,000**

CICS

Conglomerate needs CICS expert. Min two years and presently doing it.
Salary to **$27,000**

Stan Allen
ROBERT HALF
of Tampa, Inc.
1311 North Westshore Blvd.
Tampa, FL 33607
(813) 876-4191

COLUMBUS

PROJECT MGR

High caliber firm needs life insurance expertise. Keys to high visibility position begin with project leadership exp, knowledge of systems software development and ability to interface with both vendor and users. Salary **$32-38,000**

PROGRAMMER/ANALYST

National firm seeking 3 plus years COBOL and programming exp. Insurance and business applications a plus in this IBM 4341, IMS CICS environment. Salary **$22-26,500**

SYSTEMS PROGRAMMER

Very progressive service bureau seeks dual environment exp to work conversion from Honeywell to IBM 4341, MVS, CICS, VSAM shop. Do Networking, Database, and light interfacement with applications.
Salary **$25-35,000**

EDP AUDITOR

Degree a must with 4 plus yrs of system analysis and programming. Two plus yrs of actual EDP Auditing highly desirable. Other pluses are IBM, MVS, JCC, and TSO Database exp. Salary **$26-33,000**

Paul Bowers
ROBERT HALF
of Columbus, Inc.
88 E. Broad St., Suite 1150
Columbus, OH 43215
(614) 221-9300

AUSTIN

SYSTEMS PROGRAMMER

Degree preferred, 3+ yrs syst programming exp on IBM 4341. CICS+, VM & OS+, Assembler+. **$28,000**

FIN'L PROGRAMMER ANALYST

Degree preferred, COBOL, IBM environment, CICS, on-line applications. Retail exp + +.
$26,000

Tina J. Romans
ROBERT HALF
of Austin, Inc.
400 E. Anderson, #334
Austin, TX 78752
(512) 835-0883

SAN ANTONIO

SR SYSTEMS PROGRAMMER

Degree preferred. Must have been in systems area or Tech team member for at least 5+ yrs. Also be current on OS/MVS, CICS, NCP, Internals, 3705 etc. Large shop needs Sr level person to coordinate and execute Systems updates sysgens, new development etc. Position is visible and will lead to Mgr slot when capabilities are proven. **$OPEN**

SYSTEMS ANALYST

Degree required. At least 5+ yrs in analyst role with OS-IMS-COBOL-PL-I (a plus)-FOCUS-Insurance or Financial appls. If you want a progressive, profitable co environment with no limit for future growth, this one's for you. **$OPEN**

OPERATIONS MANAGER

Degree preferred. At least 8+ yrs in DP with last 3 yrs in Supervisor or Mgr role. Data Entry, Control and 3 shifts need attention with documentation, incident reports, etc to be addressed. Very visible. Must have IBM/DOS environment experience. Reports to MIS Director. **$26-30,000**

PROGRAMMER ANALYST

Degree preferred. Analyst in financial or retail appls a MUST. IBM DOS/VSE COBOL shop, on-line, networking is the environment. A real challenge with no limit to professional growth/earning with this Fortune 50 company. This won't last long. **$26-30,000**

All positions above and many more are in Texas, where "Long Necks", "Armadillos" and the "Cotton Eyed Joe" call home.

Bob Baldauf
ROBERT HALF
of San Antonio, Inc.
6243 I H 10 West, Suite 850
San Antonio, TX 78201
1-800-531-5402
In Texas Dial (512) 736-2467

MILWAUKEE

SR SYSTEMS ANALYST

Opportunity to design new on-line systems for a multi-billion dollar organization. You will need several years of COBOL programming experience & analysis background in an OS/MVS environment. **Mid $30's**

POTENTIAL DP MANAGER

Join the staff of a very progressive S/34 shop as a Programmer/Analyst. The right person will have the inside track to become the next DP Manager. You will need several years of RPG II programming & analysis experience. **$30,000**

Dick Bird
Larry Braden
ROBERT HALF
of Wisconsin
777 E. Wisconsin Avenue
Milwaukee, WI 53202
(414) 271-HALF (271-4253)

KANSAS CITY

DIRECTOR

Leading edge major mid-western hospital seeks an aggressive take charge director. Degree required with a proven track record of management in the medical field. Good technical awareness in a large scale IBM environment required.
Salary to **$55,000**

SOFTWARE

State-of-the-art MVS shop seeks junior MVS internal programmer who wants to be cross trained in communications and performance tuning. First assignment will be providing software support to regional data centers implementing the latest releases of MVS and IMS.
Salary to **$36,000**

George Waterman
ROBERT HALF
of Kansas City, Inc.
127 West 10th
Kansas City, MO 64105
(816) 474-4583

NORTH FLORIDA

CONTRACT OPENINGS

We have been retained by a Central East Coast Florida based Insurance Company to locate Data Processing Contract personnel. The positions are Project Leaders, Programmer/Analysts and Programmers. Backgrounds must include IBM, DOS/VSE, COBOL, CICS. In addition experience with Insurance applications and DMS Data Base is desired. Length of contracts range from 6 to 15 months. Housing will be provided. Hourly contract rates will depend on positions and experience.

Doug Cook
ROBERT HALF
of Jacksonville, Inc.
9550 Regency Square Blvd.
Suite 213
Jacksonville, FL 32211
(904) 721-0970

SOUTH FLORIDA

SYSTEMS PROGRAMMERS

Expanding division of international corporation has urgent need for software programmers. You must have working knowledge in Large IBM operating systems. Minimum 3 years MVS/JES 2 internal experience or ACF-VTAM system generation experience or 2 years IMS internals with heavy assembler background will qualify you for these outstanding South Florida opportunities. Excellent advancement and comprehensive benefits included. Client pays fees plus relocation. Salary to **$40,000**

Chuck Neil
ROBERT HALF
of Miami, Inc.
2655 Le Jeune Road #814
Coral Gables, FL 33134
(305) 447-1757

MINNEAPOLIS ST. PAUL

PROG UNIT MGR

Nationally known medical institution in So Minn needs a scientific research mgr. Req'd: 8+ yrs DP, mgmt exp and statistical programming bkgrd.
Salary **DOQ**

Mark Devid
ROBERT HALF
of Minneapolis/St. Paul
2236 IDS Center
Minneapolis, MN 55402
(612) 339-9001

NEW YORK

FORTRAN ON-LINE

Prominent midtown corporation has a position available for the strong FORTRAN programmer/analyst with 2+ years experience. College degree essential. Our client, a dual Data General installation, has a sophisticated communications network. Applications are varied and include financial, sales and marketing. This opportunity gives a fast track DP pro an opportunity to shine and work closely with top mgmt.
Fee Paid. **$26,000**

DATAPOINT/DATABUS NATIONWIDE TRAVEL

Superior opportunity exists with this prestigious financial conglomerate. This is a high visibility position which requires 100% travel for one (1) year, then home based in NYC. Responsibilities will include supervising the installation of Datapoint Systems with advanced Data Communications, provide on-site support and work closely with vendors and upper mgmt. Strong Datapoint/Databus experience required. Tremendous growth potential and great benefit package make this a unique technical and personal opportunity. Fee Paid. **$35,000**

COBOL/OS/IMS SOFTWARE DEVELOPMENT

Internationally renowned corporation, has an opportunity available for a strong COBOL/OS programmer with 3+ years experience and knowledge of IMS. Responsibilities include development, maintenance and enhancement of computer audit software. Future growth will include promotion to Product Mgr for IMS. Top-notch skills are required for this sophisticated and technical environment. Fee Paid. **$35,000**

WANG VS PROG/ ANALYST SYSTEM ANALYST

Our client, a prestigious midtown financial corp, is expanding its DP staff in anticipation of a new WANG system to be installed soon. They are recruiting for 2 DP pro's with a minimum of 2 years interactive COBOL programming experience and good systems design background, on either IBM or WANG hardware. This S/A position will involve limited programming. Excellent ground floor opportunity in all development environment. High visibility with corp management.
Fee Paid. **$30,000**

ROBERT HALF
of New York
522 Fifth Avenue
New York, NY 10036
(212) 221-6500

DAYTON

EDPEOPLE

Vigorous and growing computer installations require technical guidance. Find new challenge here.

- MVS/JES2, 1-2 yrs exp, 370/303x/43xx environment. **$30-36,000**
- MVS System tuning, 1-2 yrs exp, Assembler, Sysgens a+. **$27-32,000**
- DOS, internals & performance tuning, CICS, 43xx environment. 25% travel, company plane. **$22-25,000**

Technically speaking...
Better positions, by HALF.
Fee Paid.

Jim Lee
Susan Robinson
ROBERT HALF
of Dayton
First National Plaza
Dayton, OH 45402
(513) 224-0600

WASHINGTON

SCIENTIST/PROGRAMMER

Washington metro firm seeks scientists to build state-of-the-art computer systems. Requires BS in physical science, math or computer science and 2 years of Fortran or Assembler. To **$28,000**

ROBERT HALF
of Washington
7316 Wisconsin Ave.
Suite 401
Washington, DC 20814
(301) 652-1960

SOUTHERN CALIFORNIA

LOS ANGELES

MULTIPLE OPENINGS

Don't wait — Winter's around the corner. We need you now! Outstanding openings exist in Systems Programming, EDP Audit consulting. Plus business and scientific applications at all levels. Fee Paid.
$20,000 to 50,000+

Joe Reese
ROBERT HALF
of Los Angeles, Inc.
3600 Wilshire, #2000
Los Angeles, CA 90010
(213) 386-6805

ORANGE COUNTY

SYSTEMS PROGRAMMERS

Work in sunny Southern California, close to the beach, on large scale IBM hardware with state-of-the-art software. Backgrounds in MVS, Telecommunications and Database are needed. Proven education and work experience can open the door to an excellent career opportunity and a Southern California life-style. Fee Paid.
Salary to **$40,000**

Al Handler
ROBERT HALF
of Orange County
2333 N. Broadway, #200
Santa Ana, CA 92706
(714) 835-4103

NEW ORLEANS

SYSTEM PROGRAMMERS

If you have a min of 2 yrs Sys Prog exp, we have several pos available. Past exp must include DOS/VSE/CICS/DL1 or IMS. To **$37,000**

BANKING

Prog, P/A, S/A, Mgr positions available. Two + yrs banking exp req'd. COBOL, IBM or BURROUGHS, OS or DOS. Tymeshare a +. To **$40,000**

ROBERT HALF
of Louisiana, Inc.
4630 One Shell Square
New Orleans, LA 70139
(504) 524-3773

ORLANDO

PROGRAMMER/ANALYST

1-2 yrs exp COBOL & CICS Command level. To **$25,000**

SYSTEMS PROGRAMMERS

Multiple openings for MVS, NCP, SNA, VTAM. IMS or CICS a+. To **$40,000**

PROJECT LEADERS

Exceptional opportunity for supervisory exp with lg IBM, CICS or IMS. To **$35,000**

Pam Evans
ROBERT HALF
of Orlando
2699 Lee Road, Suite 415
P.O. Box 17892
Orlando, FL 32860
(305) 628-2836

PHOENIX

SYSTEMS PROGRAMMER

Several large Phoenix corporations have retained us to recruit for their systems programmer positions. You can take your pick of industry environments. MVS VTAM, CICS, NCP, EDX/EDL, SNA and IMS opportunities available.
Salaries to **$38,000**

Ed Caron
ROBERT HALF
of Phoenix, Inc.
3550 N. Central Ave.
Suite 1504
Phoenix, AZ 85012
(602) 264-6488

ATLANTA

SR SYSTEMS ANALYST

Min 5-10 yrs exp with 2-3 in systems design; significant mfg and/or financial systems exp; large IBM equip background; IMS/DB a plus.
Low 40's

STAFF ANALYST

Pref IBM 370/150 exp with several yrs COBOL, MVS, CICS experience helps. **$35,000 ±**

PROGRAMMER/ANALYST

2+ years exp with RPGII, IBM S/34 and MAPICS software, Design, program & maintain on-line interactive systems; accounting & manufacturing apps; systems 38; and/or MPPII closed loop systems exp pluses. **$25,000**

Terence H. White
ROBERT HALF
of Atlanta, Inc.
3379 Peachtree Rd. N.E.
P.O. Box 10201
Atlanta, GA 30319
(404) 266-2153

ALBUQUERQUE

SOFTWARE PROG/ANALYST

Challenging career position offered to strong IBM technician. Requires 3+ years DOS in Assembler. CICS. Excellent growth potential as co expands operations. Start **$30,000**

Dick Starnes
ROBERT HALF
of New Mexico
P.O. Box 3320
Albuquerque, NM 87190
(505) 884-4557

ST. LOUIS

DATABASE ANALYST

Major financial consulting firm seeks an experienced IDMS analyst. This high visibility opportunity requires 2 years with IDMS and BAL. Outstanding company paid benefits. Will be part of implementation team.
Salary to **$31,000**

TECHNICAL SUPPORT MANAGER

Rapidly expanding software vendor seeks an IBM experienced DP professional. Must be experienced with OS or VM and TSO or CMS. DB expertise a definite +. Previous employment in an information center support environment would be excellent. Salary **$30-32,000**

CONSULTANTS/SYSTEMS ANALYSTS

Prestigious national consulting firm seeks several analysts with excellent written and oral communication skills. Must have 3-5 years experience in health care, banking or manufacturing. Degree required. IBM background preferred
Salary **$25-35,000**

Randy Pace
Delores Cook
ROBERT HALF
of St. Louis
7733 Forsyth Blvd.
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SYSTEMS ARCHITECTS

Chart the course of retail systems in the '80s with NCR

Maintaining and further extending NCR's acknowledged preeminence in retail systems calls for a special kind of architect. An orchestrator and innovator who grasps system complexities in their entirety. With the ability to unify interactive and transaction processing... distributed data processing... data base management systems... operating systems... communications networks... processors terminals and peripherals into a single comprehensive retail system.

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Any of the following positions will give you a highly influential role in shaping the future of NCR retail products... and by extension, the future of the entire retail industry.

Processing Systems Manager

Lead the Processing Systems Architecture group in defining the processor family for complete distributed retail systems. Provide broad current knowledge in OS internals, hardware systems architecture, and modern high level languages. Must have the ability to lead and manage a group of senior systems architects.

Processing Systems Software Architect

Participate in the design of the processor family for complete distributed retail systems. Provide current knowledge and experience in OS design and development, communications networks, data base management systems, and distributed data processing.

Processing Systems Hardware Architect

Participate in a definition of the processor family for complete distributed retail systems. Provide current knowledge and experience in the design and development of CPU's, memory, I/O subsystems, and communications hardware architecture.

Distributed Systems Architect

Participate in a definition of systems management facilities for complete distributed retail systems. Provide current knowledge in distributed systems, in SNA, public data networks, local area networks, transaction processing, CICS internals, and IBM CNM products.

Background should include an advanced degree in CS or equivalent and 6 or more years of systems design/development experience. Salaries will be commensurate with experience and responsibilities. Benefits, including relocation assistance, are what you would expect from an expanding $3 + billion computer company.

For prompt, confidential consideration, please send your resume with salary history to: Mr. Stephen Green, Personnel Resources, Systems Engineering—Retail, NCR Corporation, Dept. S55, Software Development Center-4, Dayton, Ohio 45479.

NCR

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Interviews will be conducted throughout the United States this September. You will interview with the V.P. Engineering and his Department Managers. ***Call for an appointment in your area.***

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We offer such benefits as medical, life, ADD, disability, profit sharing, 5 day work week, overseas premium. While based in Saudi Arabia, you will additionally receive 30 working days vacation, 15 holidays, free furnished family housing, free children's education, annual return home travel, paid relocation expenses plus eligibility for new liberal tax exclusions just recently passed.

Saudi Arabia positions are family status and require a 1 yr. commitment in Saudi Arabia for the SYSOREX staff. Please send resume to Personnel, SYSOREX INTERNATIONAL, INC. 10590 N. Tantau Ave., Cupertino, CA 95014. (408) 996-9363. INDIVIDUALS ONLY APPLY.

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Computer Task Group, Inc. is a $40 million Professional Services firm with a national network of 20 offices. We have made a major commitment to providing consulting and application development services to companies using Cullinane's IDMS-82 software products.

We are seeking professionals with 5 years experience in data base/data communication applications and at least 2 years of solid IDMS DB/DC experience.

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NCSC maintains corporate headquarters in Richmond, VA as well as regional offices in Chicago and Dallas. Currently openings are available at both our Richmond and Chicago facilities.

For these positions you should have a familiarity with IBM DOS, DOS/VS, DOS/VSE or EDOS operating systems and be proficient in Assembly language programming.

Richmond Corporate Headquarters

Sr. Technical Writer

Provide user documentation for our operating system products. We seek a professional whose talents combine systems programming experience with strong technical writing skills.

Technical Education Specialist

Conduct in-house and customer education for our operating system products. Instruction proficiency and systems programming or operating systems background is desired

Software Support Programmers

Provide customer support for our operating system software and related software products, be responsible for enhancements and program fixes to operating system products. Requires systems programming experience with a background in customer contact and troubleshooting desired.

Software Programmer/ Software Engineers

Working in Development Division, involved in creating system software products. Experience in the design, development, and/or modification of system software required.

Chicago Regional Office

Systems Programmer

As a member of the teleprocessing team, a solid understanding of spooling and job entry subsystems is required. Experience with one or more of the following is desired: BTAM, VTAM, RTAM, JEP, POWER, and EXCP Channel programming, subtasking, interrupt handling, BSC and SDLC protocols and multileaving

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Provide supportive system software services, including operating system gens, installation and maintenance of program products, creation of utility and test procedures, programs and datasets. Requires minimum 2 years' systems programming experience and 1 year of VM/CMS IBM program product installation experience desired.

If you're interested in one of these opportunities, please forward your resume, including salary history to:

Mike Duffer, Technical Recruiter,
Nixdorf Computer Software Company,
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We are looking for Programmer/ Analysts who are currently familiar with IBM 370 or 4300 equipment. An in-depth knowledge of **COBOL, DOS/JCL** and **VSAM** is absolutely essential. While exposure to CICS and/or DL 1 would be helpful, an individual with the right credentials will be trained. Will receive exposure to Data Base and On-Line Transaction. **A minimum of 2 years' work experience in a DOS environment is required.**

Positions are available in the following areas:
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assistant systems programmer

We are seeking an experienced individual to fill this position to assist the Senior Systems Programmer. Duties will include the maintenance of all systems software, systems libraries, and normal systems program duties. Minimum qualifications are 2 years with the following: DOS/VSE or DOS/VS, VSAM, JCL, COBOL, PL/1 or ASSEMBLER, CICS and DUMPREADING. Experience with ICCF, ADR, PANVOLET XEDIT, EDGAR would be helpful. Any exposure to SYSGEN, SIPO or V/M is a plus.

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LARGE, MODERN, TECHNICALLY SOPHISTICATED CLIENTS located in the SUNSHINE STATE have requirements for OPERATING SYSTEMS SOFTWARE SPECIALISTS in the areas of DATA COMMUNICATIONS or COMPUTER PERFORMANCE MEASUREMENT or OPERATING SYSTEMS SUPPORT. Experience with IBM, DOS/VS or MVS or VM/370 or IMS or CICS or VTAM or 3705 and ASSEMBLY LANGUAGE are desirable. Please submit RESUME or CALL (to 8 PM EST).

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Requires creative, highly motivated professionals with extensive background in systems programming or control systems software development. Results-oriented, customer responsive environment. Development openings are within the following groups:

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- **Data Communications**
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- **On-Line Query**
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- **Application Development System**

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Requires senior level (minimum 3-5 years) experience in design, development and implementation of financial (general ledger, A/P, A/R, etc.) or manufacturing applications. Database background essential. Project leadership experience desirable. Good communication skills and ability to work independently.

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Professionals with a high degree of expertise are needed to provide technical support via the telephone to **Cullinane's** growing community of users. Success in this role requires the demonstrated ability to interact and communicate effectively with users. Requires extensive Assembler with experience in one or more of the following; 3-5 years in systems programming; database systems such as IDMS or IMS; on-line systems such as IDMS/DC or CICS; installing and maintaining BTAM, VTAM or TCAM. Occasional travel required.

Opportunities are available at our District Support Centers in Atlanta, Chicago, Los Angeles and Philadelphia as well as in our Headquarters in Westwood, MA.

For prompt, confidential consideration, please forward resume, specifying position of interest, to Carolynn Levy, Dept. 913CW, **Cullinane Database Systems, Inc.**, 400 Blue Hill Drive, Westwood, MA 02090.

Database Software Sales Representatives

Excellent opportunities for sales professionals who can demonstrate a successful track record in vendor software sales or have a strong background in data processing/database management with IBM or compatible equipment. Opportunities are available in Chicago, Los Angeles, New York and New Jersey.

Product Marketing Manager

- **Manufacturing Systems**

An exceptional opportunity is available for an individual who possesses a high degree of technical expertise and the ability to communicate systems concepts to prospective users and our own field sales organization. Qualified candidates should possess excellent presentation skills and be able to develop multi-media presentations and various sales support tools. A full degree and some marketing exposure helpful.

For prompt, confidential consideration, please forward resume, specifying position of interest, to Roy Evarts, Employment Manager, Dept. 913CW, **Cullinane Database Systems, Inc.**, 400 Blue Hill Drive, Westwood, MA 02090.

P.S. If you're a software professional and you're in the area Wednesday or Thursday, September 15 or 16 from 5-9 p.m., consider this your invitation to attend our Open House at Corporate Headquarters in Westwood, Massachusetts to discuss these and other opportunities.

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Scientific Database and Systems Development Coordinator

American Society for Metals, the world's leading source of technical information on metals, and the National Bureau of Standards are conducting a joint program to gather, evaluate, compile, disseminate, and store numerical and graphical data and textual information on alloy phase diagrams. Alloy phase diagrams are cornerstones of metallurgical technology that summarize the many characteristics and capabilties of existing and theoretical alloys. A key function in the program is the computerized Information system for inputting, manipulating, storing, and retrieving data that flow through the program.

The Database and Systems Development Coordinator will be responsible for developing software systems and establishing operation of the database, including interactive output capabilty.

The position is located at National Bureau of Standards headquarters at Gaithersburg, Maryland. Candidates should present their formal education and background in science and technology areas, and should be completely familiar with state-of-the-art method in numeric and graphic data storage and retrieval, and in systems and software analysis and development. Experience in metallurgical or materials engineering is a plus. The position is available immediately.

Please submit your letter of interest, resume, and salary history and expectation to:

Mr. Hugh Baker
ASM Manager
Alloy Phase Diagram Program
AMERICAN SOCIETY FOR METALS
Metals Park, Oh 44073

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DATA BASE ADMINISTRATOR

Cleveland Electric Illuminating Company an electric utility serving north east Ohio is seeking an individual, preferably with a degree, to provide total technical support in the data base administration area. Candidates must have 3-5 years experience as a data base administrator in IMS/VS shop. Also should have experience in monitoring and tuning of data bases, physical and logical design, data base back up and recovery, and documentation and procedural develpments. IBM Data Dictionary desirable. Salary commensurate with experience and qualifications. Excellent benefit package. Will pay relocation expenses. Interested candidates must forward resume with complete salary history. **No telephone calls will be accepted.** Please forward resumes to:

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Cleveland Electric Illuminating Co.
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Cleveland, OH 44101

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You will have substantial interface responsibilities with the Saudi Arabian representatives. We prefer you to have experience dealing with international clients. This position offers many outstanding compensation advantages and features. This position is family status.

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The Charter Company has an immediate career opportunity for an experienced systems programmer. Our multi-CPU, large scale data communications network, currently supports VM, OS/VSI, and DOS/VSE.

A minimum of 1 year in DOS/VSE or OS/VSI **systems generation** and **software maintenance** is required. VSAM and/or CICS knowledge or expertise is helpful.

We offer an excellent starting salary, a substantial benefits package, and an environment that recognizes performance and encourages creativity.

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Charter

Manager of Employment
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Jacksonville, Florida 32231

(For additional information, call 904-358-4107)

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The University Computer Center is equipped with an IBM 4341 mainframe computer and an HP3000 computer. To boost the computing capacity of the existing facilities, the Center will soon be installing a more powerful mainframe. Parallel with upgrading its hardware facilities, the University invites applications to join its software team in maintaining and upgrading its services to the University's user community.

Systems Programmers

Applicants should possess a degree in computer science or a basic university degree with relevant computing experience. Knowledge of IBM operating systems is essential, in particular, VM/CMS and/or MVS. Preference will be given to candidates with working knowledge of IBM370 ASSEMBLER language. Successful candidates will be responsible for supporting and tuning the mainframe computer operating system.

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Applicants should possess a degree in computer science or a basic university degree with experience in systems analysis/programming. Successful candidates will have the opportunity to design, implement and maintain computerized systems.

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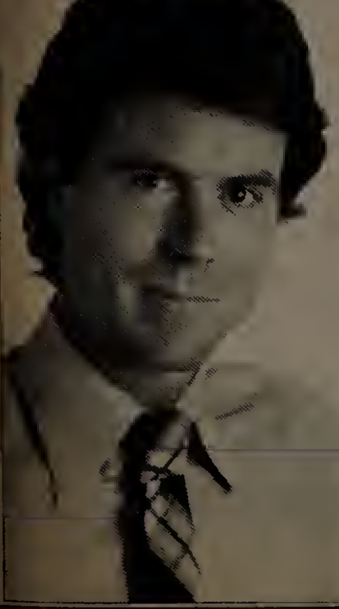

Experienced Systems Programmers and Programmer/Analysts wanted now.

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Analysts/Programmers

Minimum requirements are 3 years IBM COBOL with some experience with IMS, IDMS, or CICS.

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Minimum 3 years experience in the generation, installation and support of IMS or MVS. We desire a background in some of the following: G.I.S., strong T.P., Performance Tuning, SMP-4 and OS JCL.

Systems Analysts

Experience in designing and installing banking applications, preferably on large IBM hardware.

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A minimum 10 years experience directing the business aspects of a profit oriented Data Center - IBM and/or NCR hardware background preferred.

Project Managers

A minimum of 7 years experience in managing projects, preferably banking applications and management of analysts and programmers in a dynamic environment.

Data Communications Specialist

Minimum 2 years experience with NCR mainframes, terminal networks, telecommunications troubleshooting in a multiple vendor environment. This position ONLY is in Saudi Arabia.

Customer Account Manager

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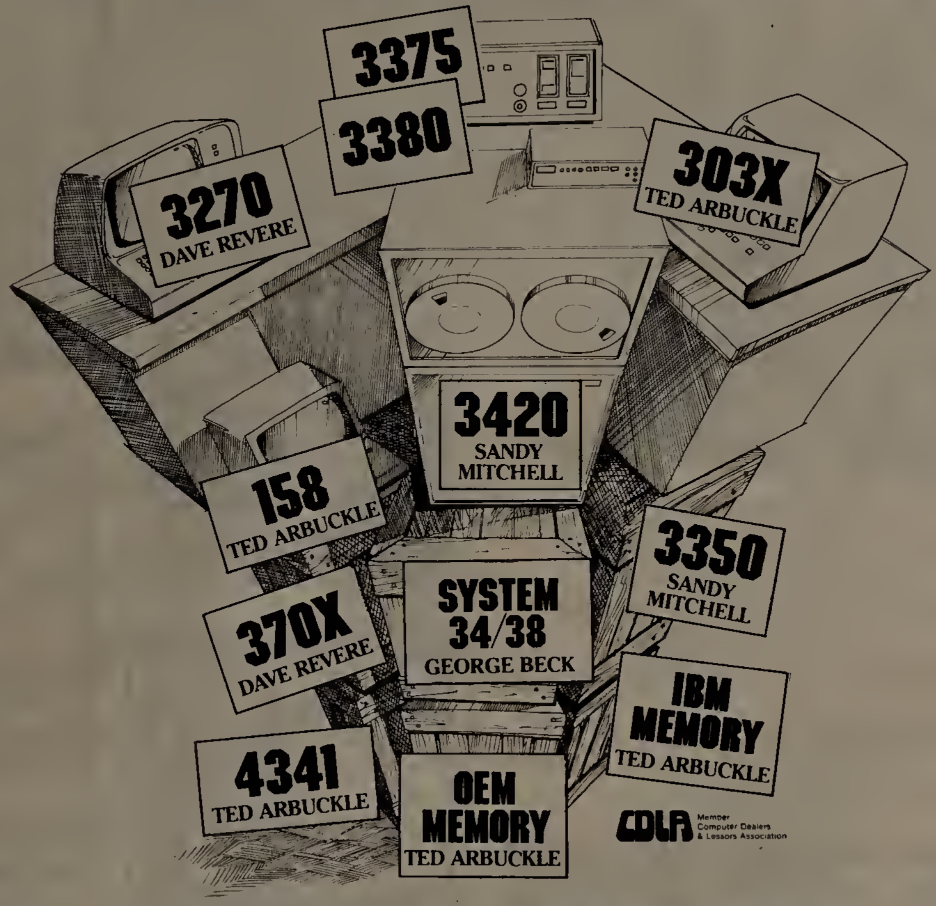

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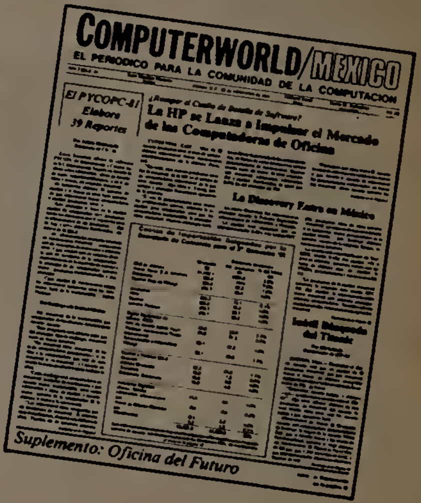

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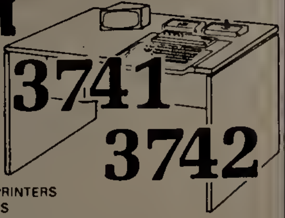

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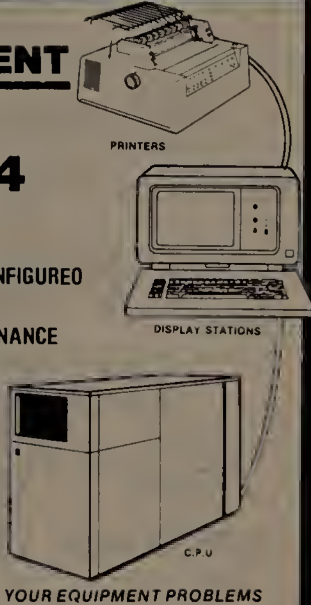

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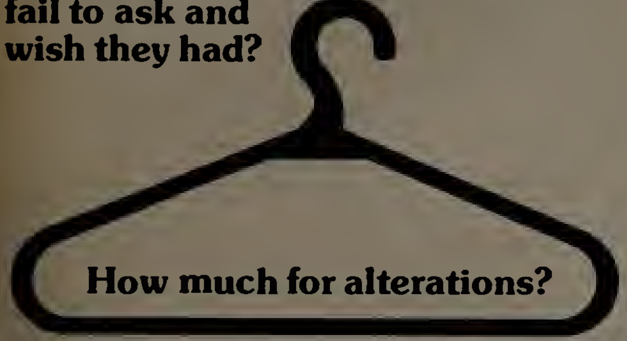
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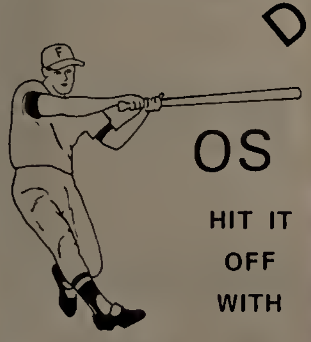

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Bausch & Lomb 55
BDS Computer Corp. 17
John Beall 99
Boole & Babbage ID/12
Braegen Corp 78
C.C.S., Inc. 100
Chubb Advanced Training Center 36
Cincom Systems, Inc. 71
CMI Corp. ID/5,10
Codex Corp. 14-15,84
Communications Research ID/15
CompEd ID/13,31
Computer Devices, Inc. 52
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Computerworld International 108
Computerworld Office Automation 94
Computerworld Spain 76
Compuware 69
Control Data Corp./LPSD 32-33
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Database Design, Inc. 25
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Datagraphix 62-63
Datapro Research Corporation 27
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Data Set Cable Co., Inc. 100
Datasource Systems 46
Dataware, Inc. 36
D.B. Systems, Inc. ID/19
Decision Data Computer Corp. 93
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Digital Equipment Corp./NPM VAX 56-57
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The DMW Group 18
D.P. Facilities 54
DTSS/Tempo 53
Dysan Corp 72-73
Eastman Kodak 39
Emulex Corporation 30
Essential Computer Products 100
The Functionality Group 53
Fusion Products 72
Gemini Information Systems 102
General Research Corporation 38
Genesys 48-49
Goal Systems, Inc. ID/19
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On-Line Software International 38
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Pansophic Systems, Inc. 79
Polygon Associates 70
Prestige Expositions 83
Quadram Corp. 64-65
Questronics ID/16
3R Computers 92
Selanar Corp. 87
Sheraton Tara 44
Signal Technology 102
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University Computing Co. 82
U.S.Data/Marketing Services ID/16
The User Group 55
Verbatim 58
Vertex Systems, Inc. 65
VM Software 70,76
Walker Interactive Products 26
Wang Laboratories, Inc. 51
Xerox-Computer Service Division 68
Yourdon 5
Zenith Data Systems ID/7
Zilog-Systems Division 96-97

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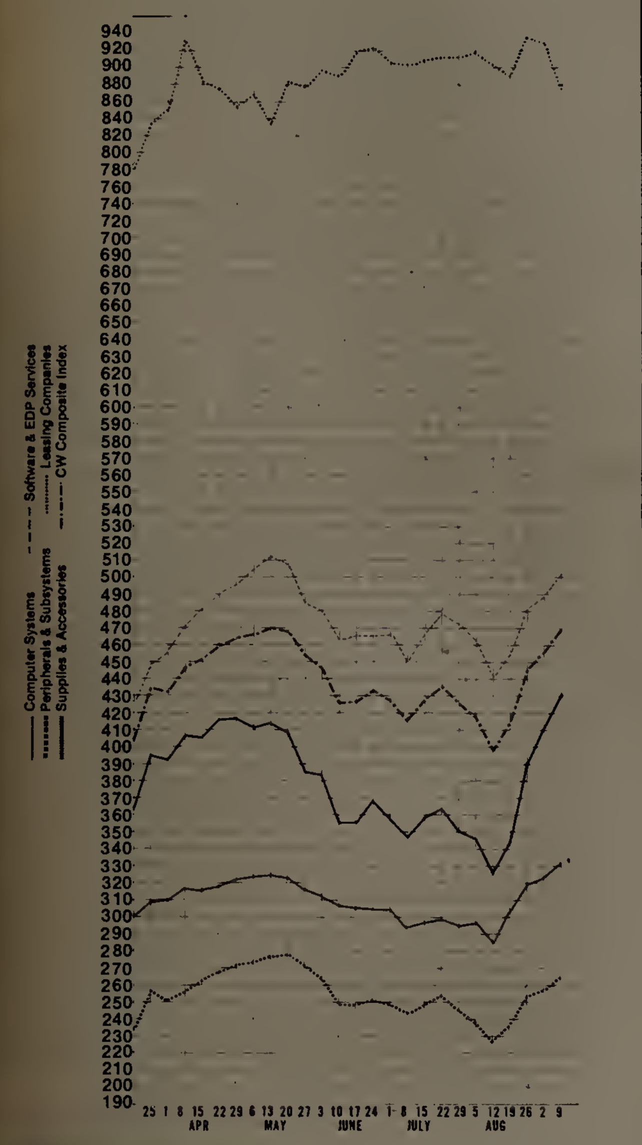
Computerworld Stock Trading Index



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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPTEMBER 8, 1982

All statistics compiled,
computed and formatted
by
TRADE QUOTES, INC
Cambridge, Mass 02139

EXCH		PRICE			
		1981-82 RANGE (1)	CLOSE SEPT 8 1982	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	18- 46	23 7/8	- 3/8	-1.5
N	BURROUGHS CORP	28- 72	37 1/8	+1 1/8	+3.1
D	COMPUTER AUTOMATION	8- 28	11 5/8	+1 3/8	+13.4
N	CONTROL DATA CORP	19- 42	30 1/4	+1 7/8	+6.6
N	CRAY RESEARCH INC	20- 49	27 1/2	- 5/8	-2.2
N	DATA GENERAL CORP	21- 87	28 3/8	0	0.0
N	DATAPOINT CORP	11- 68	17 1/8	+ 5/8	+3.7
N	DIGITAL EQUIPMENT	62-113	86 1/4	+4 1/2	+5.5
A	EECO INC	6- 19	8 7/8	+1	+12.6
N	ELECTRONIC ASSOC.	5- 13	9 3/8	+ 7/8	+10.2
N	FLOATING POINT SYST	13- 30	25 3/4	+1 5/8	+6.7
N	FOXBORO	22- 62	28 1/2	+ 1/8	+0.4
O	FULCRUM COMP GRP	1- 3	1/4	0	0.0
O	GENERAL AUTOMATION	3- 16	4	0	0.0
N	HARRIS CORP	21- 60	31 1/8	+3 1/8	+11.1
N	HEWLETT-PACKARD CO	33- 54	52 3/4	+ 3/8	+0.7
N	HONEYWELL INC	60-115	84 1/2	+8 7/0	+11.7
N	IBM	49- 73	72 1/2	+2 3/4	+3.9
O	IPL SYSTEMS INC	5- 13	5 3/4	+ 1/2	+9.5
O	MAGNUSON COMP SYSTS	2- 32	2	- 5/8	-23.8
N	MANAGEMENT ASSIST	7- 26	10 5/8	+1	+10.3
O	MINI-COMPUTER SYST	0- 4	3/8	0	0.0
N	MODULAR COMPUTER SYS	7- 32	8 5/8	+ 1/2	+6.1
N	MOHAWK DATA SCI	10- 32	15	+1	+7.1
N	NCR	39- 76	65 1/4	+4 5/8	+7.6
N	PERKIN-ELMER	17- 36	24 1/4	+1 3/4	+7.7
N	PRIME COMPUTER INC	16- 49	27 1/8	+3 3/4	+16.0
N	SPERRY CORP	21- 65	26 3/4	+1 7/8	+7.5
O	TANDEM COMPUTERS INC	13- 35	24	+1 1/4	+5.4
N	TEXAS INSTRUMENTS	71-151	99 1/8	+6 5/8	+7.1
A	WANG LABS "B"	24- 37	36 1/4	+3 1/4	+9.8
A	WANG LABS "C"	21- 38	37 7/8	+2 7/8	+8.2
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	18- 29	22 1/2	0	0.0
N	COMDISCO INC	15- 27	19 3/4	+2 1/8	+12.0
B	COMMERCE GROUP CORP	1- 1	1/2	- 1/8	-20.0
O	COMPUTER INVSTRS GRP	1- 2	1/8	- 1/8	-50.0
O	CONTINENTAL INFO SYS	4- 9	8 1/2	0	0.0
N	DPF INC	5- 13	10 3/4	+ 3/4	+7.5
O	ITEL	1- 5	5/8	0	0.0
O	LEASPAC CORP	1- 2	1/8	0	0.0
N	U.S. LEASING	18- 30	27 3/8	- 3/8	-1.3
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6	1 3/4	0	0.0
O	ADVANCED SYSTEMS INC	9- 15	11 1/4	+1	+9.7
O	AGS COMPUTERS INC	7- 10	8 1/2	0	0.0
O	ANACOMP INC	10- 19	11	+ 1/8	+1.1
O	ANALYSTS INTL CORP	3- 14	7 1/2	0	0.0
A	APPLIED DATA RES.	13- 26	26	+1	+4.0
O	ASK COMPUTER SYSTEMS	11- 17	16 3/4	+ 1/2	+3.0
B	ASTRADYNE COMP IND	1- 5	1 1/4	0	0.0
N	AUTOMATIC DATA PROC	21- 32	27 1/8	+3 3/8	+14.2
O	CGA COMPUTER ASSOC	4- 25	5 3/4	0	0.0
O	COMPUTER ASSOC INT'L	12- 21	21	+ 1/4	+1.2
O	COMPUTER HORIZONS	1- 3	2 1/4	- 1/8	-5.2
O	COMPUTER NETWORK	4- 8	6 1/2	+ 3/8	+6.1
N	COMPUTER SCIENCES	11- 30	14 7/8	+1 3/8	+10.1
O	COMPUTER TASK GROUP	10- 23	9 1/2	0	0.0
O	COMPUTER USAGE	2- 10	2 5/8	- 1/8	-4.5
O	COMPUTONE SYSTEMS	12- 21	19 1/4	+ 1/4	+1.3
O	COMSERV CORP	9- 16	15	+ 1/2	+3.4
O	COMSHARE	6- 21	6	+ 1/4	+4.3
N	CULLINANE DATABASE	15- 37	35 1/4	+1 5/8	+4.8
O	CYCARE SYSTEMS INC	9- 14	10	+ 1/2	+5.2
O	DATA DIMENSIONS INC	1- 3	1/4	0	0.0
O	DATATAB	1- 4	5/8	0	0.0
O	DYATRON CORP	2- 11	3 1/8	+ 1/8	+4.1
N	ELECTRONIC DATA SYST	15- 33	31 3/4	+ 1/2	+1.5
O	INFORMATICS INC	10- 23	13	+ 1/2	+4.0
O	INSYTE CORP	1- 3	2	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 1/8	0	0.0
O	KEANE ASSOCIATES	4- 8	4	0	0.0
A	LOGICON	12- 38	16 5/8	+1 1/4	+8.1
O	MNGT SCI AMER INC	17- 26	24 1/2	+ 3/4	+3.1
O	MATHEMATICA INC	8- 17	14 3/4	+1 1/4	+9.2
O	MATHEMATICAL APP GRP	12- 28	12 1/2	0	0.0
O	NATIONAL DATA CORP	13- 28	18	+ 3/4	+4.3
O	PANSOPHIC SYSTEMS	8- 15	12 1/2	+1 1/4	+11.1
N	PLANNING RESEARCH	5- 13	7 3/4	+ 5/8	+8.7
O	PROGRAMMING & SYS	1- 2	1 3/8	0	0.0
O	REYNOLDS & REYNOLD	16- 26	22 1/2	+ 1/2	+2.2
O	SEI CORP	17- 28	24 1/2	+ 3/4	+3.1
O	SHARED MEDICAL SYST	26- 37	35 1/8	+1 3/4	+5.2
O	SCIENTIFIC COMPUTERS	6- 16	9	- 1/2	-5.2
O	SOFTWARE AG	5- 23	6 3/4	- 1/4	-3.5
N	TYMSHARE INC	13- 58	19 3/4	+ 3/4	+3.9
A	URS CORP	10- 18	11 1/4	+ 1/4	+2.2
N	WYLY CORP	7- 20	10 1/8	0	0.0
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	1- 15	7/8	-	-11.7
A	ANDERSON JACOBSON	9- 26	10 3/4	+ 1/8	+1.1
O	AUTO-TROL TECHNOLOGY	8- 62	12 3/4	- 1/8	-0.9
O	BANCTEC INC	7- 35	11 1/2	+1 1/4	+12.1
A	BEEHIVE INT'L	4- 18	5 1/2	- 1/2	-8.3
A	BOLT,BERANEK & NEW	9- 25	16 5/8	+ 3/8	+2.3
O	CAMBEX CORP	2- 9	2 1/4	+ 1/8	+5.8
N	CENTRONICS DATA COMP	7- 40	8 3/4	+1 5/8	+22.8
A	CETEC CORP	4- 9	4 1/2	0	0.0
O	COGNITRONICS	2- 11	4 3/4	+1	+26.6
O	COMPUTER COMMUN.	1- 2	5/8	0	0.0
A	COMPUTER CONSOLES	16- 28	23 3/4	+ 5/8	+2.7
O	COMPUTER DEVICES INC	4- 10	9 7/8	+1 1/8	+12.8
O	COMPUTER TRANSCEIVER	3- 9	4 1/8	+ 3/8	+10.0
N	COMPUTERVISION CORP	20- 49	26 1/8	+ 1/8	+0.4
N	CONRAC CORP	17- 28	26 1/4	+ 3/8	+1.4
A	DATA ACCESS SYSTEMS	2- 15	1 3/4	0	0.0
A	DATAPRODUCTS CORP	16- 44	23	0	0.0
O	DATARAM CORP	4- 15	5 5/8	+ 1/8	+2.2
O	DATUM INC	2- 5	2	0	0.0
O	DAVID JAMISON CARLYL	2- 7	2 3/4	- 1/8	-4.3
O	DECISION DATA COMPUT	3- 6	5 5/8	+ 1/8	+2.2
O	DELTA DATA SYSTEMS	1- 4	1	- 1/8	-11.1
N	ELECTRONIC M & M	3- 9	4 1/4	0	0.0
O	EVANS & SUTHERLAND	18- 40	27 1/2	0	0.0
N	GEN'L DATA COMM IND	7- 19	8 3/4	+ 1/4	+2.9
O	GENERAL TERMINAL CP	0- 4	1/4	0	0.0
O	GREAT SOUTHWEST IND	1- 12	3 1/4	- 1/4	-7.1
N	HAZELTINE CORP	19- 35	28 1/2	+1 1/2	+5.5
O	INFORMATION INTL INC	8- 17	14 1/2	+ 1/2	+3.5
O	INTEL CORP	21- 51	37	+1 1/2	+4.2
O	IPL SYSTEMS INC	5- 15	5 3/4	+ 1/2	+9.5
A	LUNDY ELECTRONICS	7- 18	10 1/8	- 1/4	-2.4
A	MSI DATA CORP	11- 27	18 1/4	0	0.0
O	NETWORK SYSTEMS CORP	14- 26	25 7/8	+1 7/8	+7.8
O	OMEX	3- 8	3	0	0.0
N	PARADYNE CORP	24- 52	35	+1 1/4	+3.7
A	PENRIL CORP	7- 17	9 1/4	- 1/4	-2.6
O	RAMTEK CORP	9- 23	15 3/4	+ 1/2	+3.2
N	RECOGNITION EQUIP	4- 21	6 3/8	+2	+45.7
O	SCAN DATA	1- 5	1 1/4	0	0.0
N	STORAGE TECHNOLOGY	16- 40	22 3/8	+1 5/8	+7.8
O	SYKES DATATRONICS	7- 34	8	+ 1/2	+6.6
A	T BAR INC	7- 19	7 3/8	- 1/2	-6.3
A	TEC INC	4- 11	9	+ 5/8	+7.4
N	TEKTRONIX INC	36- 70	41 3/4	+1	+2.4
N	TELEX	5- 11	11 1/4	+1 1/4	+12.5
O	TESDATA SYSTEMS CP	3- 17	3 5/8	- 1/2	-12.1
A	TIMEPLEX INC	7- 19	11 3/4	+1 1/8	+10.5
O	VISUAL TECHNOLOGY	9- 15	12 1/4	0	0.0
O	WILTEK INC	1- 3	1	0	0.0
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	11- 17	13 1/2	+ 1/8	+0.9
O	BALTIMORE BUS FORMS	1- 2	3/4	- 1/4	-25.0
N	BARRY WRIGHT	14- 24	16 5/8	+1	+6.3
O	CYBERMATICS INC	1- 2	1	0	0.0
A	DUPLEX PRODUCTS INC	12- 17	16	+1 1/2	+10.3
N	ENNIS BUS. FORMS	15- 25	25 1/8	+2 7/8	+12.9
N	3M COMPANY	48- 65	62 1/2	+2	+3.3
O	MOORE CORP LTD	26- 38	32 3/4	+1	+3.1
N	NASHUA CORP	9- 33	11 1/8	+1 1/8	+11.2
O	STANDARD REGISTER	30- 50	50 1/4	+3	+6.3
A	TAB PRODUCTS CO	12- 30	16	- 1/4	-1.5
N	WALLACE BUS FORMS	22- 37	36 7/8	+1 7/8	+5.3

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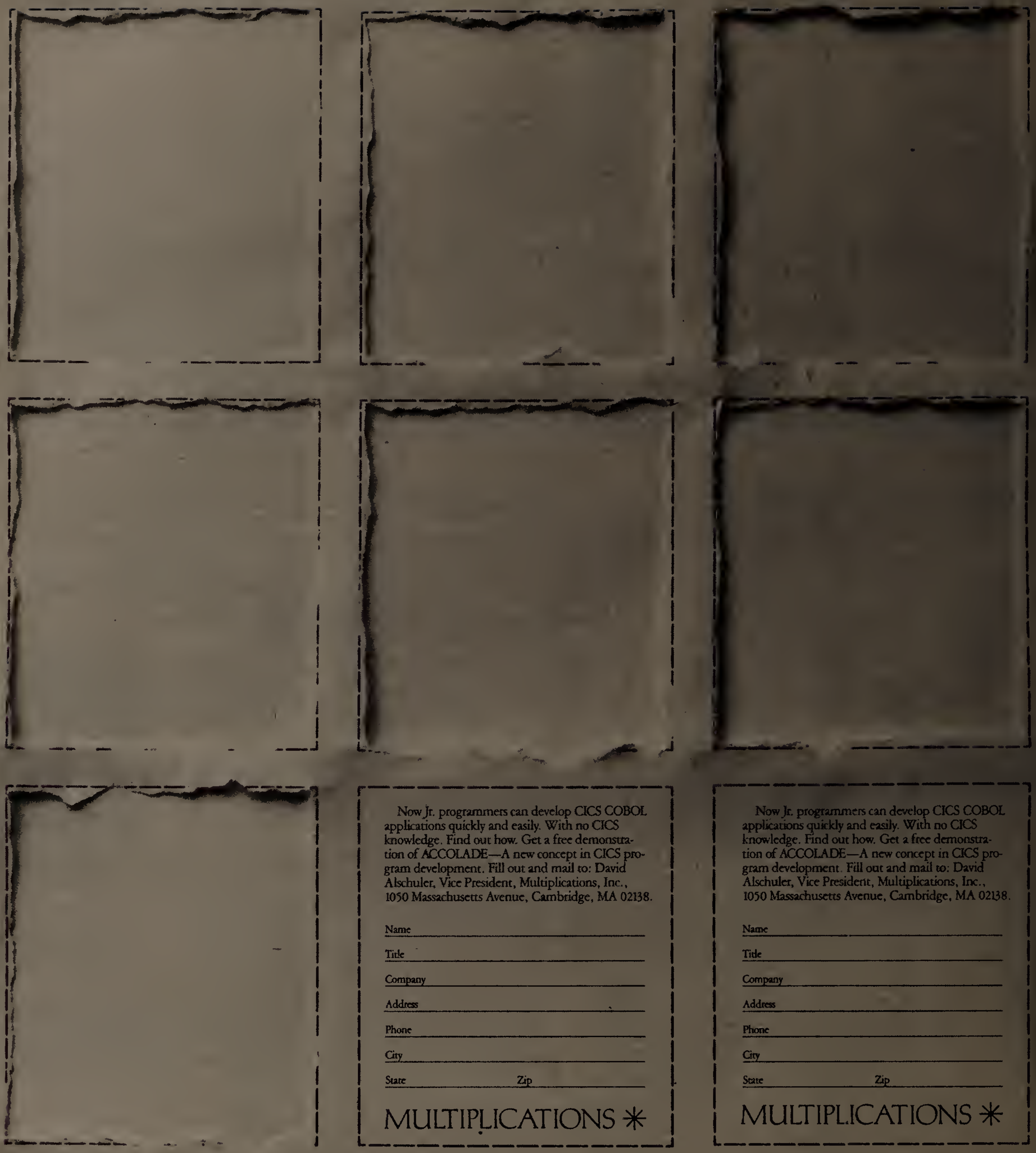

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